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The Canadian Medical Association Journal

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Foreword—1925

WITH this issue the JOURNAL enters upon a new year, the fifteenth of its publication as the JOURNAL of the Canadian Medical Association. Looking back upon the work accomplished during these years, we appreciate the notable advance that has been made by our Association both in its organization and its membership. Scattered throughout our far flung provinces, our members through the efforts of our secretary, have been brought together in local, district and provincial societies, and thus linked, form one harmonious body with greatly increased power and influence for good. Of this, the conference held a few days ago in Ottawa to discuss national problems affecting the profession generally gave ample proof. The enrolled members of our Association to-day number close on three thousand, and we can look forward to the future with hope, believing that in a few years every regular registered member of the profession in the Dominion will be a member of our Association and have an interest in our JOURNAL.

With this rapid development of our Association, the JOURNAL has endeavoured to keep pace. During the past decade it has doubled the number of its reading pages, and increased their size. We believe that it has at the same time markedly improved in its appearance and in its worth as a medical journal.

With this first issue of a New Year the Editorial Board desires to remind the members of our Association that this JOURNAL is their property, and also to emphasize the aim of the Board to make it a thoroughly representative organ in which the profession in every province may take an equal pride. They hope to have the JOURNAL regarded more and more during the coming year, as the medium of publication for all papers written by members, which contain material of value to the general practitioner. Those papers which present new facts and new thoughts, the result either of observation at the bedside or of research in the laboratory, will be especially valued. The JOURNAL will also welcome reports of cases, interesting in themselves or presenting peculiar features, the knowledge of which may be of value to others. Furthermore, the JOURNAL will open its columns occasionally to carefully considered constructive criticisms regarding any activity or lack of activity in local, district or provincial societies. Its abstracts culled from the pages of the more important medical journals of every country will, we hope, enable our readers to keep in touch with all medical advances throughout the world. Arrangements have been made with our printers to ensure an improvement in the character of our illustrations during the coming year, and as soon as our finances will permit the price of reprints will gradually be lowered.

To our contributors in the past we desire to express our thanks. The character and practical value of the papers which we have published during the past year have been of a high standard; some of them of a very high standard. In addition to the regular monthly issues a special number containing the first Listerian Oration, by Dr. John Stewart, of Halifax, was brought out; and we are pleased to say has brought forth many favourable comments.

Some form of affiliation with the British Medical Association has been under consideration for several years. This past year we were favoured by a visit from two of the officials of that Association, Sir Jenner Verrall and Dr. Alfred Cox; we are glad to state that after free discussion a form of affiliation was arrived at, by which our Association, without losing any of its individuality, becomes affiliated with the parent Society, and through it with the medical profession in all the sister Dominions of the Empire. This will confer certain privileges upon our members. We hope that this action may lead to many pleasant interchanges between our Association and the profession in Great Britain, and in the other Dominions.

To our subscribers we wish for each one a happy and successful year; we look forward with confidence to the continued growth of our Association in useful activity and importance. The Editor will endeavour during the coming year to increase the value of the JOURNAL to every member.

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An Address on

THE CAUSE OF DYSPNOEA*

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DURING the past fifty years there have occurred two broad developments in medicine which have not always received the recognition which is their due. They are the advancements which have taken place in pathology (or morbid anatomy) and clinical medicine (or morbid-physiology). Their importance viewed in a comprehensive manner has many times been obscured by individual discoveries. Pathology has now advanced to such a realm of philosophical study as to take its place as an independent science. The progress of medicine in the true sense of the word namely, the study and investigation of the processes of disease in the living organism is slowly but surely advancing. This does not mean only the recognition of particular structural changes and their classification, but, in addition, the elucidation of abnormalities of function with or without obvious alterations of structure. These abnormalities of function have been studied in the human, and where possible have been reproduced in animals in order that the interpretations and conclusions might be placed on a truly experimental basis. Amongst such advances are those in the realms of cardio-vascular and pulmonary diseases. The exact methods of the laboratory have been brought to the bed-side and the problems of the bed-side have been taken to the laboratory. If either be carried out alone much is lost. This is a danger to the advancement of medicine that must never be lost sight of. Those who discard or disdain one or the other of these fields of work cannot develop the knowledge of medicine on the broad basis upon which it must rest if it is to continue to be the foster-mother of the natural sciences, or to be granted freely the dignity of a science itself. Sir Archibald Garrod[1] has brilliantly outlined the great debt science owes to medicine. As medicine has developed on surer ground there have broken away fundamentally important parts of her matrix such as physiology, anatomy, pathology and pharmacology. Although these sciences constitute an important part of medical education, yet their development has tended increasingly to separate them from the problems intimately connected with the elucidation of disease as met with in man. It has been a great stimulus to these subjects as independent sciences but it has been a grave disadvantage to medicine. Not only did she lose many of her brightest and most enquiring minds, but more recently the ranks of these sciences have been filled by those who know not medicine and her difficulties. In consequence of this the investigative minds in medicine have sought to blaze for themselves a new trail. This new land may probably be described best as "Experimental Medicine". The problems of the bed-side are being investigated with the true experimental spirit such as stimulated Harvey some two and a half centuries ago. All sources of knowledge are used by these investigators to accomplish their ends. Their endeavour has gone far to elucidate and place on a scientific basis many of the problems consequent upon diseases of the circulation, respiration, ductless glands and other organs. It is with one of the symptoms of abnormal respiration that I wish to deal at present.

Probably the most important sign or symptom referable to the respiratory system as a whole is dyspnoea. It therefore behooves us to define what dyspnoea is and how it is produced. It may be said that "dyspnoea is the consciousness of the necessity for increased respiratory effort[2]." Its production has been admirably defined by Means as follows:

*This communication is an abridged account of lectures on this subject given to medical students of McGill University in the course on the "Principles of Medicine."

"Dyspnoea will occur whenever the respiratory mechanism cannot with ease functionate to the extent that bodily processes require[3]." In this complete definition of the sensation and production of dyspnoea it must be remembered that the consciousness is always referred to the pulmonary function, while the cause may be either in the lungs or in some far distant part of the animal organism. In fact we must distinguish between the pulmonary and cellular respiration and realize that each may produce this symptom and also that they may combine together to accentuate it.

It will be useful in the first instance to briefly review the control of pulmonary respiration. This resolves itself into two broad classes, namely the chemical and the nervous regulations. It may be said that the chemical regulation of pulmonary respiration depends upon the pH. of the tissues in general. This is sometimes of a local nature when through some vascular lesion or selective poison the medullary centres are particularly affected. But usually it is of a more general character when all the cells of the body are subjected to this change and the respiratory centre, that indefinite area in the medulla, is affected along with the other cells of the animal organism. A change of pH. may either stimulate or subdue the respiratory effort. If it be decreased, or in other words the hydrogen-ion concentration be increased, the pulmonary ventilation will be augmented. If on the contrary the pH. be increased and consequently the hydrogen-ion concentration decreased the pulmonary ventilation and effort will become less. Both these changes are consequent upon a change in the relative acidity or alkalinity of the arterial blood and tissues. This is regulated to a great extent by that very diffusible but weak acid carbon-dioxide. If there be a relative decrease in the available base or an actual increase in the acid ions, which may disturb this equilibrium, the pulmonary respiration responds to the relative acidosis and by increased ventilation eliminates an increased amount of carbon-dioxide. This easily diffusible acid is readily withdrawn from the blood and the tissues and so its removal helps to maintain their normal reaction. If on the contrary there is an excess of alkali or a relative decrease in the available acid ions the contrary occurs. The pulmonary ventilation becomes less in order that this weak acid—CO_2 may be retained in the tissues so as to contribute to maintaining their normal reaction. In this manner we see how the pulmonary ventilation may be increased (hyperpnoea) or decreased (apnoea) by the changes in reaction of the tissues.

In addition to the above there may be certain conditions which enhance the stimulus of the normal pH. as far as pulmonary ventilation is concerned. The most potent factor to induce this is oxygen want. It seems now to be quite definite that oxygen want in the tissues renders them and incidentally the respiratory centre in particular, more sensitive to the normal chemical reaction. If this be produced acutely a conscious increase of pulmonary ventilation will ensue even at rest. If however it occurs gradually the slight increase in this ventilation will not be obvious and the respiratory effort will not seem to be disturbed. This is only applicable under resting conditions; when physical effort be added with its increased call for oxygen due to the increased metabolism and energy demanded, hyperpnoea will occur whether the oxygen starvation be acute or chronic.

In addition to the disturbances of the chemical regulation of respiration which produces dyspnoea, there are also those resulting from either an anatomical defect of the lungs or a functional disturbance of the pulmonary respiration. These are intimately bound up with the chemical regulation of respiration but under certain conditions are quite independent of it. In this relation we must take into consideration the normal demands of the body for oxygen and elimination of CO_2 which are such important factors in its metabolism. Also we must consider the manner in which the lungs functionate to accomplish this important function under normal and abnormal conditions, and the instances where the chemistry of the arterial blood and the tissues are at fault.

The most common cause of dyspnoea is physical exertion. It can be readily understood that this is a quantitative condition and what may produce dyspnoea in one individual may not do so in another. This is the case in otherwise presumably normal people. The hyperpnoea of exercise is due to the increased metabolism which occurs. This does not lead to any dis-

tressing symptoms until the demand for oxygen and elimination of carbon-dioxide is greater than the lungs can perform with comfort. If the work be continued or increased the respiratory distress of dyspnoea will become greater and greater. The reasons underlying the differences between various presumably healthy individuals does not concern us at present.

In conditions where there is an increased metabolism when at rest as in fever and increased thyroid activity the point of effort where dyspnoea may be produced is reached at a much earlier stage than in comparative health. In fact it may be produced by the slightest exertion even when the patient is in bed. These cases are examples of a summation of metabolic activity with all the demands to meet such a state. Therefore, if the sum of the metabolism be great enough dyspnoea will be produced even when at absolute rest.

One of the important causes producing hyperpnoea on exercise is the necessity to rid the body of carbon-dioxide in order that the H-ion concentration of the arterial blood may be kept at a normal level. Therefore if there be any disturbance of the chemistry of the body which induces or allows the formation of excessive acid ions in the tissues or in the blood in sufficient quantity to seriously disturb the acid-base equilibrium, hyperpnoea will ensue in order that the carbon-dioxide may be removed in increased amounts. This would tend to re-establish the acid-base equilibrium. Carbon-dioxide is particularly suitable for such a function as it is so readily diffusible and can be removed from the tissues with comparative ease. If the acid-base equilibrium be disturbed sufficiently to produce a pronounced hyperpnoea then dyspnoea will be felt, while the slightest physical effort will accentuate it. The best examples of dyspnoea due to such causes are to be found in diabetes mellitus and in failure of the renal function. In diabetes there is an excessive formation of fatty acids (beta-oxybutyric and aceto-acetic acid) in the tissues which increase the hydrogen-ion concentration in them and in the arterial blood. This brings about a disturbance of the acid-base equilibrium and in consequence there is hyperpnoea to remove the relative excess of CO_2. This increased ventilation may amount to acute respiratory distress or dyspnoea. Coincident with complete destruction of the excessive amounts of these fatty acids by means of insulin or increased carbo-hydrate metabolism or both; or through their temporary neutralization by alkalies, the dyspnoea may be relieved.

In renal insufficiency there may be an incomplete elimination of normally formed acid-ions. This may lead to their excessive retention which in time will produce a disturbance of the acid-base balance. If this be so hyperpnoea, soon followed by dyspnoea, occurs. The relief of the disturbance of renal function will completely remove the dyspnoea. On the other hand temporary improvement in the respiratory distress may be induced by the introduction of hydroxl-ions in the form of di-sodium phosphate or less efficiently by sodium bi-carbonate. The beneficial effect of this therapy may be determined by frequent observations of the "bi-carbonate reserve" or "CO_2 combining power" of the blood. But the more expert observers will be guided by the character of the respirations. They have, by repeated comparison of blood findings with the respiratory reaction, acquired an understanding of this phenomena based upon experimental data.

In addition to these cases of diabetic and nephritic acidosis there are other but less definite conditions where through an accumulation of lactic acid or other organic acids in the blood and tissues dyspnoea may result. These cases are rarer and have not been so fully investigated as the others and need not concern us to-day, except to make us remember that dyspnoea of this type without other obvious cause may be due to such a condition and the rational treatment of it is accordingly indicated.

Somewhat analogous to these cases of dyspnoea due to excessive acid ion formation or retention are those which occur as a result of an interference with the elimination of carbon-dioxide. These cases are, however, somewhat more complicated. The lesions inducing such a condition are usually if not always caused by some abnormality of pulmonary respiration. This being the case, an interference with the acquisition of oxygen is usually associated. This would be apt to accentuate the respiratory distress. If we carefully consider the situation we will find that the pulmonary lesion may be one of two types, or both combined. Either of

them may produce an interference with the alveolar ventilation (*a*) through some chronic structural deformity such as emphysema, partial collapse of the lung, thickened pleura, tumour of the lung or pleura, etc., or (*b*) by some acute lesion such as pulmonary oedema, bronchiolitis, the early stages of pneumonia and other acute alveolar lesions. In the first class the structural lesion is insidious in its course and therefore allows the organism an opportunity to accommodate or acclimatize itself to the new functional environment. If we take emphysema as an example we find that the CO_2 partial pressure of the inspired air is greatly increased, and the oxygen pressure lowered. This is compensated for by an increase in the alkali reserve and by a polycythaemia. In this manner the hydrogen-ion concentration of the blood and tissues are not greatly altered from the normal. The tissues are also accustomed to function at a somewhat lower partial pressure of oxygen although this is prevented from falling to too low a level in the venous end of the capillaries by the relatively increased quantity of oxygen in every 100 cc. of blood. Such individuals can perform a moderate amount of work without distress or dyspnoea but when they exceed a certain limit of exertion the consciousness of respiratory effort suddenly becomes distressing. This occurs because their reserves have reached their limit and there is not the facile accommodation to increased pulmonary ventilation which is so characteristic of the normal individual.

In the acute cases on the other hand no compensatory mechanism has been developed. The sudden retention of carbon-dioxide produces an uncompensated gaseous acidosis which acts as a violent stimulant to the respiratory centre. To this is added the sensitizing effect of acute oxygen want. The combination of these two stimulating forces accounts for the urgency of the respiratory distress and also the relatively rapid failure of respiration which frequently occurs in these cases. If either the CO_2 retention or the oxygen want could be relieved this disastrous condition might be prevented. As yet we have no emergency means of preventing the former, but by increasing the partial pressure of oxygen in the inspired air the acute oxygen want may be in part or completely removed. This is particularly the case in acute oedema of the lungs and in the early stages of pneumonia whether lobar or lobular. In all of these conditions there are many alveoli which are non-functioning but through the capillaries of which the blood is passing non-aerated to pollute the arterial blood coming from the functionating alveoli. This interference with aeration is relative. If the partial pressure of oxygen of the inspired air be increased sufficiently the oxygen will penetrate the liquid alveolar exudate and the swollen cells and reach the capillary blood. This may not always be possible but it is the only known method of giving relief to such cases. I wish to emphasize its importance in the early stages of pneumonia. It is frequently at this time that the most urgent dyspnoea and cyanosis occurs. If the oxygen want can be relieved at this time much may be gained to help the patient through the subsequent period of complete consolidation when the bacterial toxaemia plays such an important part in the morbid phenomena.

Turning now from the primarily pulmonary causes of dyspnoea we come to those due to peripheral disturbances. These may be due on the one hand to an inability of the blood to carry sufficient oxygen for the metabolic needs of the cells, as in anaemia or poisoning by carbon-monoxide, nitrites or chlorates. On the other hand it may be due to an insufficient quantity of blood being circulated to the tissues through inefficiency of the cardiac output or to constriction of the arterial tree so preventing the blood from reaching the cells.

In those cases where the dyspnoea is caused by anaemia it is a simple problem. The oxygen carrying power of the blood is reduced by the deficiency of haemoglobin. All the tissues suffer through this lack. The maximum supply at rest may be barely sufficient to maintain the normal metabolism; on exertion this can be but slightly increased. In consequence the limits of metabolic activity and therefore of physical exertion are strictly limited. When this margin is exceeded respiratory distress will occur. This is the symptom which sufferers from anaemia usually complain of most.

The manner in which carbon-monoxide and allied poisons exert their influence in producing dyspnoea is by suddenly usurping the place of oxygen with haemoglobin. They effect more staple compounds with it than oxygen does.

Therefore although the blood may contain a normal percentage of haemoglobin it cannot carry the volume of oxy-haemoglobin which the body demands. Thus there is produced an acute oxygen want. This makes the respiratory centre more sensitive to the normal stimulus. Consequently a temporary hyperpnoea with dyspnoea may ensue until the partial pressure of carbon-dioxide is sufficiently reduced, when it ceases. This hyperpnoea may not occur however. The usurpation of the haemoglobin by these abnormal substances may be so gradual that the oxygen want may never be acute enough to give rise to respiratory distress. An analogous condition is found in balloonists and air men who slowly reach extremely high altitudes with correspondingly low barometric pressures. The hyperpnoea at rest is never severe enough to be uncomfortable but is sufficient to remove an excess of carbon-dioxide.

The dyspnoea occurring in cardio-vascular disease is a more complicated problem. We must consider the question from several points of view. In the first instance the direct result of cardiac insufficiency, from whatever cause, is a decrease in the volume of blood circulated in any given unit of time. This of course is relative under conditions of continuous rest. The minute volume blood flow may differ but little from normal when at rest in comparatively severe cases of circulatory failure, and except in the most severe, respiratory distress may be experienced only on exertion. It is here that the value of dyspnoea as an index of efficiency of the circulation is so important. It may be said that the degree of dyspnoea is in direct proportion to the severity of circulatory insufficiency. If we consider at the moment only the decrease in minute volume blood flow, we will find that the probable cause of the dyspnoea is the relative slowness of the circulation through the tissues in proportion to the metabolism. We must view the capillary circulation and the tissues as a whole, bearing in mind that the disturbances of different tissues may give rise to different symptoms and as the respiratory centre is merely part of the whole, it gives evidence of this disturbance by the occurrence of dyspnoea. The slowing of the circulation tends to bring about an abnormal reduction in the partial pressure of oxygen in the capillary blood, this will result in the tissues working under conditions of a relative oxygen want. In addition to this there will tend to be an accumulation of carbon-dioxide. Both these factors individually tend to produce hyperpnoea and dyspnoea, and if acting together induce this symptom to a conspicuous degree.

It has been found in circulatory failure that there is a decrease in the vital capacity of the lungs. This decrease and the degree of failure of circulation may be said to be parallel in certain cardio-vascular lesions. The reduction in the vital capacity would appear to be produced by a decreased expansibility of the lungs consequent upon capillary engorgement resulting from an abnormal slowing of the general circulation. The effect of this capillary turgescence would seem to be analogous to the stiffening which occurs during the engorgement of erectile tissue. It may be quite readily understood how this decrease of vital capacity would be an important factor in aggravating the dyspnoea in cardio-vascular diseases.

If by any means the epithelium of the alveoli becomes unduly swollen or there be an excessive transudate of oedema fluid or blood plasma into the alveolar and bronchiolar spaces, then a serious interference with the ready diffusion of gases between the pulmonary blood and the inspired air will occur. This will affect the oxygen diffusion more seriously than it will that of the carbon-dioxide because the latter is twenty times more diffusible than the former. the first effect therefore, of such a swelling or oedema of the lungs will be an interference with the oxygenation of the arterial blood, this will bring about a tissue oxygen want, which will be productive of dyspnoea unless the organism has had ample opportunity to reduce the relative acidity of the tissues by elimination of carbon-dioxide through the lungs. If in addition to a lowered oxygen saturation of the arterial blood, there be also a relative or absolute interference with the elimination of carbon-dioxide, thus producing a relative or absolute retention of this substance in the tissues, the hyperpnoea and dyspnoea will be aggravated. It may be concluded that dyspnoea in circulatory failure is produced by a combination of circumstances and is most severe when all of them are operative at the same time. The exact

cardio-vascular lesion which may produce this symptom does not concern us at the moment. It may be stated in general terms that the lesions which are the most important in producing this symptom are myocardial insufficiency or an obstructive lesion such as mitral stenosis both of which interfere with a sufficient quantity of blood being circulated through the arteries. On the other hand sclerosis and narrowing of the smaller branches of the arterial tree would likewise prevent an adequate supply of blood from reaching the tissues.

In the preceding paragraphs we have outlined the principal causes of dyspnoea. There are a number of instances however which do not conform strictly to the causes here mentioned. But if they are carefully analyzed it will be found that they are produced by a combination of abnormal factors, each case demonstrating to some degree a dominant cause with others contributing. Such instances are most frequently formed in the pneumonias. Here we have a combination of causes. In the first place there is the febrile reaction indicating an increased metabolism, then large areas of relatively non-functionating alveoli which not only may allow venous blood to return to the arterial stream but also reduces the vital capacity and the lung volume.

In order to properly estimate the value of dyspnoea as a symptom for diagnosis and prognosis, not to mention the indication for treatment to prevent further damage from occurring, it is necessary to understand the methods of its production. Such knowledge is one of the most interesting and valuable scientific contributions to clinical medicine, based as it is upon careful and accurate clinical and experimental data.

REFERENCES

(1) GARROD, *Brit. Med. Jour.*, ii, 1924, 747. (2) MEAKINS, *Brit. Med. Jour.*, i, 1923, 1043. (3) MEANS. *Medicine*, iii, 1924, 309.

Physiologic Effect of Massage.—In connection with a study made by Ralph Pemberton, F. A. Cajori and C. Y. Crouter, Philadelphia, of arthritis and rheumatoid conditions, analysis has been attempted of some of the measures known to benefit them. Conspicuous among these measures are exercise, the application of external heat and massage. Studies were therefore undertaken on five arthritic patients, sufficiently active and robust to permit of general and severe massage, in respect to the hydrogen-ion concentration, carbon dioxid content, oxygen content, oxygen capacity, percentage oxygen saturation, inorganic phosphorus and lactic acid of the venous blood before and after massage, and also the hourly volume, hydrogen-ion concentration, titratable acid, organic acids and inorganic phosphorus of the urine before and after massage. It is to be noted that massage of voluntary muscles, even though vigorous, is not accompanied by the evidences of lactic acid production and acidosis, which accompany relatively mild active exercise of short duration, or by the evidences of loss of acid and alkalosis, which follow exposure of the body to external heat. Massage can be used as a partial substitute for active exercise in many conditions, but its benefit must be due chiefly to some mechanism other than that reflected in the chemical changes accompanying exercise. The available evidence suggests that these benefits are referable to changes in the circulation, especially capillary. The favourable influences on the rheumatic syndrome of exposure to external heat, massage and active exercise apparently find their chief explanation in their influence on the circulation, including the capillary beds. The corollary to this is that a disturbance of the circulation constitutes part of the underlying pathologic change in rheumatic and arthritic conditions.—*Jour. Am. Med. Ass.*, Nov. 29, 1924.

Treatment of Lime Burn of the Eye.—Otto Barkan and Hans Barkan, San Francisco, review the literature of attempts to clear the cornea following lime burns of the eye. They recommend clearing such opacities with a solution of neutral ammonium tartrate, a procedure which is effective but safe only in the hands of a specialist. The early treatment of lime burn should be immediate rinsing out, lids apart, with a stream of cold water at the site of the injury.—*Jour. Am. Med. Ass.*, Nov. 15, 1924.

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THE APPLICABILITY OF UROLOGICAL METHODS OF DIAGNOSIS AND TREATMENT TO INFANTS AND CHILDREN*

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EARLY recourse to exact urological diagnostic methods, in the case of the adult patient who presents symptoms of pathological change in the urinary tract, is becoming more and more the common practice. The possibilities of applying the newer methods of urological examination and diagnosis in patients of tenderer years are not, however, so generally recognized, even by pediatrists. It is my purpose to submit to you some cases illustrative of a distinct field which is opened up by urology in this branch of medicine. Some will show the advantages of early diagnosis, while others will emphasize the dangers that result where examination has been too long delayed, and therapy rendered thereby more or less futile.

The possibilities of cystoscopy in children were first pointed out by Nitze in 1907. Since that time, numerous authors have published articles on this subject, among them, Jacobi, Casper, Portner, Beer, Hyman, Hinman, Quinby, Kretschmer, and W. E. Stevens. Beer, who was the first on this side of the water to deal with this subject, directed attention in 1911 to the feasibility of cystoscopy and ureteral catheterization in very young children. He had short instruments constructed of a calibre of 10.5 and 12.5 French, for cystoscopy and of 15 French for ureteral catheterizations. Hyman reports having catheterized the ureters in a boy of three years, and a girl of twenty-two months. Kretschmer and Helmholtz have catheterized the ureters in a female infant of seven months, with a cystoscope of 18 French calibre. W. E. Stevens, who has written more recently, reports having catheterized on several occasions, a female patient of twelve months, with a single catheterizing Wolff cystoscope of 16 French calibre. In this case, it was possible later to introduce an 18 French instrument. Hinman has recommended that in very young children an external urethrotomy should be performed and the cystoscope introduced through the incision. Most writers believe that this procedure is unnecessary and find, even in infants, that it is quite possible, and certainly so, after a preliminary meatotomy and urethral dilatation, to introduce a single catheterizing cystoscope of 15 to 16 French calibre. In one of our cases, a male aged four months, who had a pyelonephritis, complicating a congenital urethral stricture, it became necessary in the course of the therapeutic dilatations of the urethra, to introduce instruments larger than our smallest catheterizing cystoscope into the bladder. While a cystoscope was not actually passed, it was evident that cystoscopy was practicable, even at this early age, in a male patient. Once the cystoscope is introduced into the bladder, it is comparatively easy to catheterize the ureters, and to obtain specimens of urine from the two kidneys simultaneously, for chemical and bacteriological analysis, and functional tests. Even pyelography is practicable, though this method must be used with extreme caution. There is a danger of damaging the kidney, especially as the patient is usually under an anaesthetic. Naturally, other simpler diagnostic methods of the urologist are available, urethral examination, routine x-ray, cystography, etc. One would have thought that these latter methods would have been in more general use, even where cystoscopy and its attendant possibilities were not considered available. There seems, however, to have been a general impression among physicians that children will outgrow their urinary symptoms, and the expectant plan of treatment has been the

*From the Department of Urology, Montreal General Hospital. Read at a meeting of the Vermont State Medical Society, Burlington, Vt., Oct. 10th, 1924.

rule. This impression is not well founded. The genito-urinary lesions in children are much the same as in adults, and there is no reason why they should not have the same advantages of diagnosis and therapy. The urologist's armentarium is just as available to children and offers just as much in the way of therapy as in the adult, in both instances, provided that lesions are recognized early, and before such permanent damage has been effected, as to make recovery impossible.

The cystoscopes we have used in our work are Nitze examining and catheterizing cystoscope of 14 and 21 French calibre, and Wappler instruments of 16 and 18 French calibre.

The achievements of the cystoscope manufacturers, in producing and perfecting small cystoscopes have warranted more use being made of them in this field. That this is not the case, is largely due to the lack of co-operation between the general practitioner and the pediatrist, and the urologist. Recently, in the Montreal General Hospital we have secured this co-operation, and to Dr. A. B. Chandler, I am indebted for several histories which I shall relate. From the cases that have been examined, a selection has been made illustrating various types of lesions met with.

I have on several occasions removed from individuals in their teens, kidneys irretrievably damaged by infection associated with renal calculus. In several cases it was noted in the histories that the first symptom appeared at a very early age. That the condition of nephrolithiasis may be recognized early, is proven by the following case.

W. C., male, aged four years, admitted to the surgical wards of the Montreal General Hospital for prolapsus ani, was reported to have difficulty in urination, and on examination was found to have frequency of urination and pyuria. Micturition was painful, and he pulled at the end of the penis during the act. On rectal examination a hard mass was felt in the region of the prostate. Nine days after admission he developed retention and had to be catheterized. At one of the catheterizations the catheter met with an obstruction, only to slip past. Routine x-rays showed a fairly large dense circular shadow in the midline below the pubic arch overlying the penile shadow, thought to be a urethral calculus. The left kidney region revealed a large group of numerous dense shadows, resembling calculi. On the day of x-ray examination, he voided, but in the evening was seized with retention and severe pain at the end of the penis. The catheter met with an obstruction at the peno-scrotal angle. Under anaesthesia, a stone could be felt in the urethra at that site. An external urethrotomy at the site of the stone was performed; a calculus was removed; the opening in the urethra was sutured and a retention catheter inserted. Very high fever followed for about a week. The wound healed normally, and the catheter was removed in six days. As soon as the fever had abated, a cystoscopic examination under ether was made.

An 18 French Wappler single catheterizing scope was easily admitted. The bladder was normal. Both ureters were easily catheterized. The right kidney gave clear yellow urine in free flow, whereas the left gave a slow flow of pale turbid urine.

	R.		*L.*
	Clear	Turbid	Turbid milky
	Acid	1010	Acid
Albumin	0	0	Trace
Urea	0.9%	–	0.4%
Pus	0	+++	+++

Three days later a left nephrectomy was done. An attempt was made to remove the stones through a pyelotomy incision, but they were found firmly imbedded in the calices. The pathologist reported that the kidney was chronically and diffusely inflamed. An uneventful recovery was made.

Several cases of vesical calculus have been met with. The following case is a typical one.

S. B., aged nine and a half years, was recently admitted complaining of severe pain in the left side, dysuria, frequency, and pain on micturition. He had been well up to December, 1923, when he had an attack of measles. Early in January, 1924, three weeks after the measles, he began to have difficulty in voiding. Six days before admission to hospital he began to have frequency day and night, urgency, even incontinence, fever, pain in the left kidney region and pyuria.

Examination showed adenoids and foci of infection in his tonsils and teeth, a temperature of 102 2/5°, pain over the left kidney, and pyuria, the urine giving *B. coli* and staphylococcus on culture. X-rays showed two calculi in the bladder (Figure 1). Cystoscopic examination under ether was made. The urethral meatus was large but one inch in, there was obstruction to an 18 French cystoscope, and considerable force was needed to dilate the stricture, in order to enter the bladder. The presence of calculi was verified, and the left ureter was catheterized, pus being the prominent constituent of the

FIG. 1.—Boy age nine: Vesical Calculi (a).

urine obtained. The stones were removed a few days ago by suprapubic operation.

In this case, possibly during the last illness, that of measles, in the presence of this and focal infections, stones had formed in the bladder, possibly as the result of infection behind the urethral stricture. Later we see an infection in the left kidney, the obstruction in the urethra being aided by the large vesical calculi. There is every reason for believing that the renal infection will quickly subside, now that the obstructing factors have been removed. There only remains the necessity of removing any foci of infection outside the urinary tract, and keeping the urethra well dilated.

Traumatism of the Kidney.—A female child of three years was pushed downstairs by a brother. The first time she voided after the accident the urine was red, and continued so till admission to hospital. There were no external signs of any injury, except a bump on the head and scratches on the knees. Routine physical examination seemed to favour the impression that the right kidney was the site of injury, but this was not definite. A cystoscopy under ether was done, with an examining No. 14 Nitze scope, the only small cystoscope I had at that time, a much less practical instrument than the Wappler instruments now available. Through this, spurts of blood could be seen coming from the right ureter. A diagnosis of rupture of the right kidney was inevitable. The condition was treated expectantly, and within three weeks clear urine was being voided.

Hydronephrosis and Hydro Ureter.—A boy of eight years was referred to me for incontinence of urine. Ever since he was six months of age he appeared to have no control of his bladder, either by day or night. At three years he was circumcised. He was, if anything, worse afterwards. He was examined by various pediatrists from time to time, who informed the parents he would probably outgrow the disagreeable habit. His life at school and play was misery, his trousers were constantly wet. He had recently been noted to be becoming dull and just before I saw him, had apparently contracted an acute pyelonephritis, with fever and pyuria. When I first saw him, he was pale, dull, and lethargic, with coated tongue, and a bladder up to the umbilicus. He was catheterized with a small catheter, and a small quantity of pale, purulent urine drawn off. This was repeated regularly every hour and later every two hours. The examination of his blood a few days later showed urea nitrogen of 58 mgms. per 100 cc. It must have been higher before renal decompression was under way. A cystoscopy was attempted a few days later. The meatus would only admit an 8 French catheter. After meatotomy it was easy to insert an 18 French single catheterizing Wappler cystoscope. The posterior urethra was voluminous and sacculated, the colliculus large and bulky. The bladder was large, at the site of the ureteral orifices there were gaping cavities up which the catheter could be entered only 12 cm. on the right and 6 cm. on the left. Only bladder fluid was obtained; on attempting to pass the catheters further up, they reappeared through the opening, showing they were in diverticula. A cystogram with collargol was made on the following day, and it is interesting to note that collargol appeared in the urine for three days following. The conditions in the bladder and ureter are best shown by the illustration which shows large patent ureteral orifices with enormous dilatation of the ureters and kidneys (Figure 2). Following this examination, a retention catheter was tied in. The patient had been given forced fluids, low protein diet, and regular bladder lavage. Under this treatment, the boy's condition improved markedly. He became mentally clearer, brighter, gained in weight and spirits, and was not easily recognized as the dull fellow who entered hospital. The blood urea nitrogen fell gradually to normal. At a later date, instead of a tied-in catheter, regular catheterization was practised.

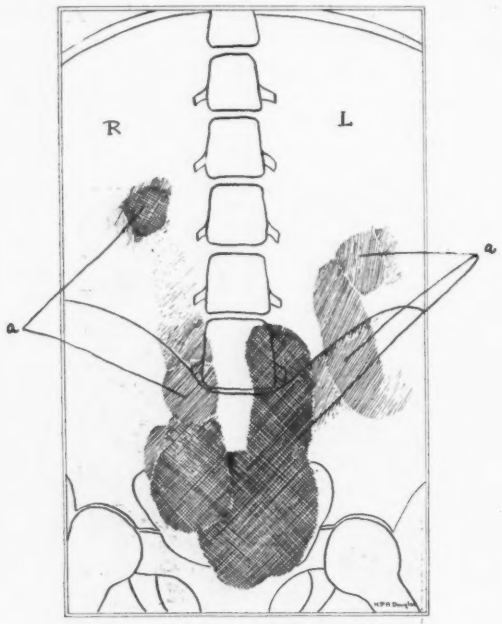

FIG. 2.—Cystogram boy nine years, stricture urethra with enormous dilatation of ureters (a) Pyelonephritis.

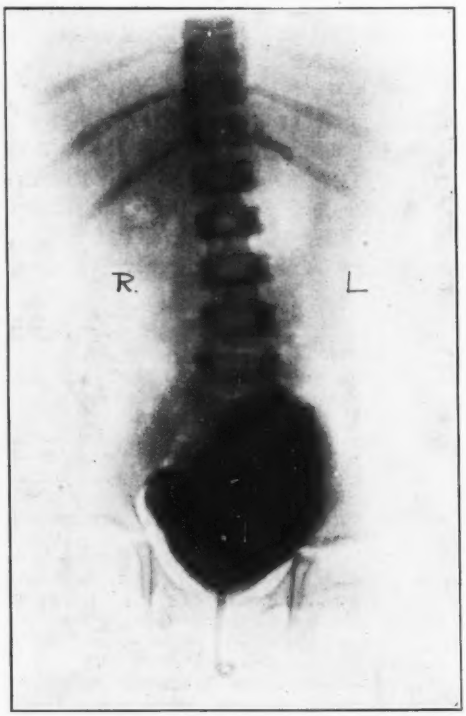

FIG. 3.—Cystogram same case as Fig. 2, after treatment.

The boy began to void and catheterization could be limited to twice a day, as the residual urine decreased in amount. A second cystoscopic examination and cystogram showed a slight reduction in the amount of the ureteral reflux (Figure 3); the urine was clearer, and of better concentration, though still containing pus. Urethroscopic examination showed no obstruction in the urethra, other than the meatal one first noted. He was allowed to go home, his mother learning to catheterize him, and care for the bladder. He is bright and clear, enjoys his school work and play, though still requiring daily catheterization.

Here was a child with a urethral obstruction which had been allowed to go undiagnosed for nearly eight years. The obstruction had produced a dilatation of the entire urinary tract above it, retention of urine with overflow, and with the inevitable infection of the urinary tract, particularly of the kidneys. The only attempt to relieve the condition was a futile circumcision. The condition was allowed to progress to a point where every attempt at urination forced as much urine back toward the kidneys as was evacuated by the urethra. The kidneys had become badly infected, and began to show loss of compensation. We were able to do a meatotomy, and relieve the obstruction, but the damage already inflicted was practically irreparable. An early systematic urological examination might have spared this boy much suffering.

The case just cited shows the effect of prolonged obstruction from a congenital narrowing of the urethral lumen. Several cases with minor complications of such meatal obstruction may be of interest. I have observed a number of cases in young male children who were circumcised for dysuria. The condition was not improved by the operation, and did not do so till a meatotomy relieved the real or associated source of trouble. Several circumcised children have been brought to me for a non-specific urethritis which promptly subsided on performing a meatotomy. In these cases it is likely that infection of a more serious nature in the kidneys would have occurred. That such infections do occur is evident from the following case.

F. S., male, aged four months, in the paediatric ward of the Montreal General Hospital, showing fever and pyuria. Cultures from the urine showed *B. coli*. This, a breast-fed infant, had been given the usual medical treatment; forced fluids with nasal drip reinforcement and alkalization of the urine. Under this treatment the child improved, and my none too insistent advice to make a urological examination was not followed. The infant was discharged, but had to be readmitted to hospital, in a worse condition than when discharged. He showed an irregular temperature rising to 102°, and pyuria, and urea nitrogen retention in the blood, with a reading of 53 mgms. per 100 cc. It was not now so difficult to secure examination. Under ether, an attempt was made to introduce a 15 French single catheterizing Wolff cystoscope. This was obstructed at a point 7 cm. in the urethra. A 12 French catheter passed the obstruction, and the stricture was dilated to 6 and 7 English sounds. Dilatation was repeated, the temperature rapidly fell, the urine cleared, the pus disappeared and the infant was discharged well. These dilatations have been repeated at regular intervals. At a recent dilatation it was possible to introduce an 18 French air dilating urethroscope, and to afford visual demonstration of the stricture, a heavy concentric narrowing, the lumen being about the size of a match. It would have been possible on this occasion to cystoscope the bladder of this four months old infant, as our dilatation had reached a calibre of 9 English, which is greater than that of our smallest catheterizing scope. In view of the improvement of the child, now gaining weight and perfectly healthy, such a procedure has not been deemed wise, even to satisfy a natural scientific curiosity.

Another case of this kind is interesting because of the fact that the urinary underlying factor in the illness of the infant was not at once evident.

A male infant of twelve months was brought to the paediatric ward of the Montreal General Hospital with a diagnosis of malnutrition. The only abnormal feature found on examination was pyuria. Coming soon after the previous case, the urological department was asked almost immediately to examine him. The infant was extremely emaciated and the urine loaded with pus. The meatus which was very tight, was enlarged by meatotomy. One and a half inches in the urethra, there was a stricture and another about an inch behind this. The strictures were dilated to 12 French. The dilatations have been repeated at weekly intervals, up to 15 French. The improvement in the infant's general condition has been slow, but he has begun to take nourishment better, the pus has decreased markedly, and at the last report, he has begun to gain weight.

The following case will illustrate the uselessness of too late intervention.

A female child of three years, whose mother died of pulmonary tuberculosis just after the child's birth, was admitted with the complaints of diarrhoea and loss of weight. An x-ray of the kidneys five months previously had revealed bilateral renal stones. She had lost nine pounds in weight, was very ill-nourished, had an evening rise of temperature, voided urine very frequently, the urine being very purulent, with no demonstrable tubercle bacilli. She suffered from an intractable diarrhoea. There was a large mass in the left renal region. Cystoscopic examination under ether was at first difficult, as the meatus was very tight. At first, only a 15 French was admitted with difficulty, but with dilatation an 18 French was inserted. The bladder was distended, and moderately trabeculated. Both ureteral orifices were gaping and easily catheterized. The cystoscope was removed after one ureter had been catheterized, the catheter left in situ, the cystoscope re-introduced, and the second ureter catheterized. Both ureters delivered turbid urine, with macroscopic pus on the left side. Phthalein was injected and appeared in twelve and eleven minutes, in traces. Left urine showed *B. coli*, staphylococcus and streptococcus. About a week subsequently, both

kidney pelves were lavaged, and the phthalein test repeated; only a trace appeared on the right side in thirteen minutes and none from the left in fifteen minutes. On both occasions pus was noted on the two sides, very profuse on the left.

Although the condition did not offer much hope, it was thought that drainage of the left kidney, obviously pyonephrotic, might be of benefit. Operation revealed large, thin-walled, fluctuating sacs, which were opened, and evacuated of their thick purulent contents. A stone could be felt but the child's condition warranted nothing more than the insertion of a drainage tube. The child was allowed to go home in the hope that better drainage of the kidney and the country air would work a miracle. She succumbed some months later.

The factor in producing infection and stone formation in this case may readily be ascribed to the meatal narrowing. That obstruction distal to the bladder existed, was evidenced by the dilatation and trabeculation of the bladder noted at cystoscopic examination. The infection and stone formation were natural consequences. The soil was prepared for the sowing of an infection conveyed from some focus of infection elsewhere in the body. In her case, a tuberculous etiology was not proven, but it might easily have been the case. A mother tuberculous during her pregnancy, in any case, transmitting a strain of poor nourishment, made the child an easy prey to infection. Bowel infection may have been the focus, or a complication, but the urethral obstruction must be looked upon as the primary cause. Its early detection might have saved the child.

The last case that I shall present will show rather strikingly the possibilities of urological examination in a slightly older child.

A child of eight years, a doctor's daughter, had suffered with pyuria for some months. Various reasons had been given for it, and she had had some bladder lavage. She had gone through an attack of scarlet fever about a year ago, and in a regular examination of her urine, pus had been discovered. It may have been present previously. She had always been in good health, and had not lost weight. No fever was ever noted.

General examination was negative. Cystoscopy could not be done with local anaesthesia, so tight was the urethra. Under ether, after dilatation of the meatus, an 18 French cystoscope was admitted and almost immediately afterwards a 21 French double catheterizing scope. The bladder was very distensible. It was, however, not trabeculated. The ureteral orifices were noticeably gaping. Catheters were easily passed. The flow from the right was normal in character, that from the left almost continuous, as if there had been pelvic retention. During the collection of urine, double the quantity was obtained from the left than from the right ureter. Specimens and cultures were taken from both sides. Phthalein was injected and appeared on the right side in eight minutes, with intense colouration. While it appeared earlier on the left, in five minutes, the color was only faint.

Analysis showed the following:—

	Right	*Common*	*Left*
	Clear	Clear	Clear
		1008	
Albumin	Faint trace	0	Faint trace
Urea	0.1%	–	0.1%
Pus	0-2 per H.P.F.	0-1 per H.P.F.	0-2 per H.P.F.
Phthalein 10 mins.	10%	–	2%
Cultures	No growth	–	No growth

While ordinarily I do not consider it wise to inject the kidney pelves of a child, and especially when under anaesthesia, in view of the very free flow

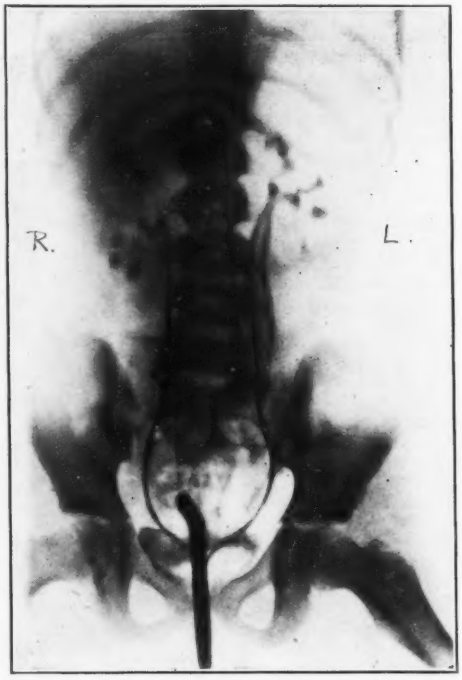

FIG. 4.—Pyelogram—girl nine years. Bifurcation left ureter.

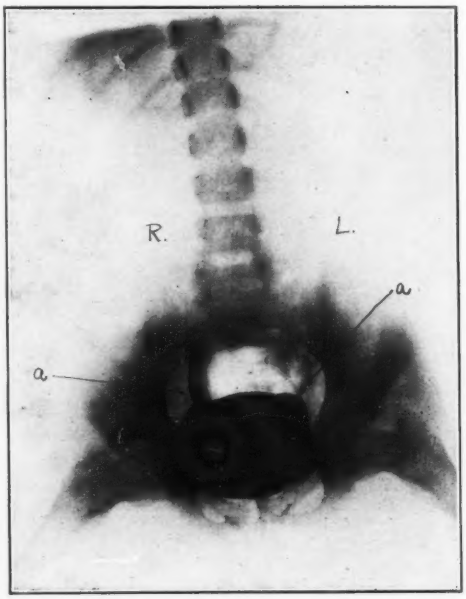

FIG. 5.—Cystogram same patient as Fig. 4. Ureteral reflux (*a*) Bilateral—more marked on right side.

in this case, I injected small amounts of sodium iodide, 12 per cent solution, on the two sides; 4 cc. on the right and 6.5 cc. on the left. The resulting pyelograms are thus described by Dr. W. A. Wilkins, our Roentgenologist:—"A double shadow is present corresponding to the course of the left ureter, the catheter being noted in the one, and absent from the other. Apparently, these shadows join above in the region of the pelvis and below at the upper margin of the sacroiliac articulation. This suggests the possibility of a partial double ureter." (Figure 4).

The following day, the bladder was injected with 150 cc. of sodium iodide, 12 per cent solution. The x-ray report reads as follows:—

"The bladder outline of each lateral margin is wavy. A quantity of the injection has entered the ureters, as high as the inferior margin of the sacroiliac articulations. This regurgitation is more marked on the right side." (Figure 5).

Unfortunately, in this case, I did not have an opportunity to make any observation as to the presence of residual urine in the bladder. In view of the definite proof of ureteral regurgitation this is very probable. We have had to deal in this case with a congenital anomaly of the left ureter. There is evidently some condition which has caused dilatation of the bladder and forced the ureteral orifices, ordinarily competent against such a reflux. The bilateral condition points to a distal obstruction, and in the urethra. A mild infection is the result, at the time of our examination, not very marked. The anomaly of the ureter may have played an accessory rôle, as we frequently see in such anomalies the factors producing infection, one ureter being liable to obstruct the other, and produce stasis of urine above. One notes frequently the association of congenital anomalies. In the presence of the ureteral anomaly, a meatal narrowing is not unusual. In her case, regular bladder lavage had dilated the urethra and made the obstruction less evident.

The treatment that is being followed in this case is of a two-fold character. Regular catheterization of the bladder with lavage, and urethral dilatation. The catheterization is perhaps more important than the lavage. Thereby, we relieve the kidneys of the back pressure which is a most harmful factor in producing infection.

It may not be inopportune to refer especially to the subject of pyelonephritis in infants and children. Most text books on paediatrics refer to this condition as a clinical entity. The treatment recommended is largely medical. Some will maintain, even urologists have done so, that pyelonephritis is a self limited disease. A consideration of several of the cases reviewed, will show that this is not always the case. Even where symptomatic cure results, the infection may persist, and with repeated exacerbations, end ultimately in complete destruction of one or both kidneys. Pelvic lavage has been lauded as a therapeutic measure in the treatment of pyelonephritis in adults. Surely, it is just as efficacious in children. Kretschmer and Helmholtz have shown this in a series of cases where this was repeatedly done, the ages ranging from seven months to ten and a half years. Personally, I am not a strong advocate for pelvic lavage. I believe that if ureteral and urethral drainage are good, the infective condition will be relieved; and it may very plausibly be argued that the improved drainage by urethra and ureters resulting from the cystoscopic introduction and ureteral catheterization, may be the factor producing the desired result.

As one reviews the cases here presented, one cannot help noting the predominance of two factors, one of cause, and one of effect; the one of obstruction, the other of infection. Remove the cause, cure follows, unless damage of vital organs by infection has progressed to such a degree, as to render restitution to normal impossible. It is obvious, therefore, that if one wishes to deal rationally with pathological conditions in the urinary tract, an early and thorough examination must be made. If we admit the necessity of a thorough urological examination in adults with symptoms of urinary trouble, it is logical that young children should have the same advantages, particularly as examination frequently offers the only means of detection of the underlying etiological factor in the production of the pathological changes. Unless the cause and exact conditions present are known, any therapy must be largely empirical and often misdirected. That the urinary tract of children and even of infants is capable of being examined thoroughly by urological methods has been amply demonstrated by the authors who have written on this subject.

In conclusion, one may confidently assert that pathological conditions of the urinary tract in infants and young children are capable of the fullest urological examination and that they should be early investigated by all the diag-

nostic methods that modern urology has to offer. Only in this way may a rational therapy be instituted.

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LUPUS ERYTHEMATOSUS AND ITS TREATMENT BY RADIUM

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LUPUS erythematosus is a toxic erythema occurring in two forms—the chronic or, localized variety, which is usually symmetrically distributed, discoidal in outline and manifests a predilection for the face; and the acute or diffuse type, which is commonly widespread, occasionally generalized, and not infrequently terminates fatally.

Aetiology—Predisposing Causes.—Age exercises an important influence. The time of onset is usually between twenty and forty years. Women are much more susceptible than are men. Extremes of heat and cold and exposure to the sun's rays predispose to attacks. A depressed peripheral circulation from any cause constitutes a favouring factor. Constitutional ailments, particularly kidney disease, liver disease, and alcoholism aid in its development. Trauma is occasionally a predisposing cause.

Exciting Causes.—Bacteriologically considered multiple and diverse causative agencies appear operative in the production of this affection. The rôle of the tubercle bacillus in this connection has long been recognized. This is especially true in the disseminate variety. Certain it is that post mortem findings frequently demonstrate associated tuberculous lesions where the same could not be diagnosed with certainty before death.

Some observers classify the disorder as a tuberculide, maintaining that the tubercle bacillus is blood borne and after being deposited in the tissues, sets up an inflammatory reaction which soon destroys the offending organism, and hence it is not ordinarily found on histological section nor does the cellular architecture correspond with that of the tuberculous lesion. Further, when susceptible animals are inoculated with tissue from the affected part, the procedure ordinarily fails to bring about characteristic tuberculous lesions in the inoculated animal.

There appears, however, to be a disposition in many quarters to challenge altogether the activities of the tubercle bacillus as a causative factor. In the writer's judgment its place in this connection seems too firmly established to be set aside. Focal infection has been invoked to explain the phenomena. Doubtless there are cases that are chargeable to this cause and explainable only on this hypothesis. Sibley reports a fatal case of lupus erythematosus disseminatus in which streptococci were found in the blood.

The following plates are given as examples of treatment with radium.

The lesion itself commonly begins in the localized form, as a small elevation which is red, dry, scaly, and marginate. It shows a disposition to clear centrally and enlarge peripherally; appearing on the cheeks it commonly gives rise to the butterfly or bat's wing distribution. Spike-like projections stud the under surface of th. crusts marking the position of the patulous openings of the enlarged follicles.

Involution may take place in the patch, either

spontaneously or as the result of treatment, leaving a characteristic atrophied scar to mark the site of the invaded area. Atrophy without ulceration constitutes the aftermath of the inflammatory process and is an important diagnostic sign. The evolution of lesions in the scalp is marked by permanent baldness, the hair follicles being destroyed.

Sometimes the dorsum of the hand, wrists and forearm are involved. The mucous membrane of the mouth or the nose is occasionally invaded. Lesions developing in these locations may be nature's danger signal, the heralds of systemic invasion.

Treatment.—A suspiciously long list of rem-

FIG. 1.—Lupus erythematosus of whole side of face. Twenty years duration; x-ray gave no relief. Radium caused complete resolution with no recurrences.

FIG. 2.—Eight years duration; no results with either x-ray or carbonic snow.

FIG. 3.—Case shown in Fig. 2, after application of radium.

FIG. 4.—Seven years duration: no result from various treatments.

FIG. 5.—Case in Fig. 4 three years after radium treatment.

edies is recommended by various authors in the treatment of the disease. In the writer's experience radium applied topically has proved of great service. A ten milligram plaque covered with oil-silk or rubberdam is applied for fifteen to thirty minutes to the circumscribed patches. The diseased area is blocked off into squares; care must be exercised that the plaque is accurately applied and held in position. Sometimes the radium is kept moving very slowly over the surface allowing approximately fifteen to thirty minute exposures for each square represented by the size of the plaque. This method tends to obviate the danger of the "postage stamp" effect often noticed when the plaque is strapped to the skin. The entire field must be covered before a treatment is complete. Special attention should be paid to the margin and the region immediately beyond it, since the morbid process is most active in these situations. It is axiomatic that the minimum radiation consistent with resolution in the affected part should be delivered to the tissues. An interval of about two months is allowed between treatments. Time must be given to enable the tissues to recover from the radiological shock. A considerable interval between treatments also lessens the danger of telangiectasia, atrophy and pigmentary anomalies. After the expiration of this time, if resolution has not taken place, further treatment following the technique outlined should be again instituted. Improvement was noticed in practically every case in which the treatment was followed out; some patients remained well, but the majority showed recurrences more or less marked, which required further applications. Radium applied topically is not the ideal agency, but only an aid to treatment. The symmetrical distribution of the lesions suggests a haematogenously borne infection. The skin manifestations are probably only symptoms and behind these cutaneous expressions a systemic cause is likely at work. Demonstrable foci of infection wherever open to attack should be thoroughly eradicated.

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The Treatment of Cerebral Spastic Paralysis.—This paper by Frank D. Dickson, Kansas City, Mo., is based on the study of ninety-two cases. Of these ninety-two patients, thirty-nine had Stoffel operations performed on one or more nerves. Of these thirty-nine patients, the adductors were weakened thirty-five times; the internal hamstrings, twenty-one times; the soleus, twenty-one times; soleus and gastrocnemius, six times; pronator radii teres, five times; flexors of wrist and fingers, six times, and the intrinsic muscles of the hand, three times. The results were excellent in ten cases, or 25.5 per cent; good in thirteen cases, or 33 1/3 per cent, and fair in fourteen cases, or 35 per cent; there were no changes in two cases, or 5 per cent. None of the patients were worse as a result of treatment. As the result of his experience with the Stoffel operation, Dickson is convinced that it does reduce spasticity, relieve contractures and bring about local improvement. Moreover, with the reduction in the spasticity locally, there is almost invariably a definite improvement in the general condition. The spasticity in other parts lessens, the speech becomes better, and the patient is usually able to perform acts that before were impossible. This is probably due to the quieting effect of the operation on the complex reflexes through which the correlation of activities in widely separated parts of the body takes place.—*Jour. Am. Med. Ass.*, Oct. 18, 1924.

Report of Mercurochrome Therapy in Four Cases of Gonorrhea and Their Complications.—Miguel Lavandera, New York, reports four cases of gonorrhea and its complications treated with mercurochrome-220 soluble, 1 per cent strength, each dose being freshly prepared in distilled water. Mercurochrome failed to exhibit any therapeutic effect in these cases. Equally inefficient has been this therapeutic agent in Lavandera's routine treatment of gonorrhea and its sequelae.—*Jour. Am. Med. Ass.*, Nov. 22, 1924.

An Address

THE TREATMENT OF CHRONIC HEART FAILURE*

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WHEN the heart cannot do the work that it is called upon to do heart failure is said to exist. There are, of course, all degrees of this failure, from that in which the reserve power of the heart is so little impaired that it is only after severe effort that any distress occurs, up to that in which that organ cannot cope with its task even when the body is at complete rest, and then death is imminent. In judging of the capacity of the heart there are two factors concerned, (1) the amount of work that must be done, and (2) the power of the heart to do this work.

When the heart muscle is quite normal probably no amount of increase in the work required of it can cause more than a temporary distress. The healthy organ can meet many times the strain usually put upon it without being unduly embarrassed or in any way damaged. But all the same, if the strain be often enough repeated, in time some tissue changes will take place in the myocardium and then further strain may cause further trouble. The athlete's heart is an example of this. The more diseased the heart muscle is the less its capacity for work so that at last the second factor is of itself sufficient to cause failure.

It is scarcely necessary nowadays to say that heart failure means failure of the myocardium, and yet for long this was not realized and one would hear of an individual dying of "mitral disease" or of "aortic regurgitation" as if these lesions were the actual cause of death. It is only in so far as these hamper the action of the muscle that they have any significance. Very often when a patient is severely ill with signs of some valvular or pericardial trouble the symptoms are due to an involvement of the adjacent heart muscle by the same infection. Or it may be that the valvular or pericardial lesion throws a strain on a muscle that is already weakened from some cause. For example, a man has a mitral stenosis but is getting on very well until he gets some infection such as an acute tonsillitis. The toxins from this focus of infection weaken the heart muscle and then for the first time the handicap of the valvular lesion makes itself felt.

Again, heart failure means failure of the ventricles. As long as these are working sufficiently there is no failure even although the auricles may have completely struck work and are in a state of fibrillation. The cause of any distress in auricular fibrillation is that the ventricles are made to beat in a disorderly fashion. Heart failure is by no means synonymous with auricular fibrillation although the two are very often associated. Failure may occur in a regular heart and may be absent in an irregular one. As a rule a failing heart is a fast one but this is not always the case and one often sees typical signs of failure where the heart is not hastened and, as mentioned, is quite regular.

It is often possible to recognize which of the ventricles is at fault, although more frequently they are both involved in the failure.

When the left one is the site of the trouble there is apt to be acute oedema of the lungs or sudden death, and short of these final features a rapid pulse, galloping rhythm or *pulsus alternans*. Extra systoles are usually not of much significance although the French writers put much more weight on them than do their English-speaking confrères. The systolic blood pressure tends to fall, and a sudden decrease in the pulse pressure is always a very serious sign.

When the right ventricle is chiefly involved the onset of the failure is usually less sudden and is more easily recognized. The blood pressure is not much lowered and, indeed, if much cyanosis be present, may actually be raised. There is venous engorgement of the various organs, shown best by signs of bronchitis, digestive disturbances, and an enlarged and tender

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liver. Oedema of the dependent parts of the body occurs with effusion into the serous cavities and oliguria. The scanty urine is apt to be albuminous, and renal symptoms may occur. It is often difficult to say whether a case is primarily one of renal disease complicated with a failing heart, or one of heart failure complicated by secondary renal symptoms; or, as the French say, one of true cardio-renal disease or one of false cardio-renal disease. Normal kidneys can concentrate urea to the extent of 3.5 to 5 per cent. Now the output of urea on an average fixed ordinary diet is about 25 grammes. If the urine amounts to 1500 cc. in the twenty-four hours this means only a concentration of 1.66%, while if the output be only 750 cc. it is 3.3%. If the kidney in heart disease can only concentrate to 3% and the urine amount to 750 cc. then only 22.5 grammes of urea will be excreted and therefore 2.5 grammes will be retained and in time uraemic symptoms may occur although there was no primary nephritis. But if the kidneys are primarily diseased and can only concentrate to say 1%, polyuria is essential and the output must amount to at least 2000 cc. If, then, owing to mild cardiac insufficiency, only 1500 cc. are passed only 15 grammes of urea are got rid of and uraemia will soon appear although the quantity of urine passed is normal in amount. As F. Moor[1] puts it, "If the kidneys are healthy a slight diminution of the urinary output due to cardiac failure will be compensated for by increased concentration of the urea in the urine; but if anuria be pronounced urea will accumulate in the blood and uraemic manifestations may occur. When the kidneys are diseased they are unable to compensate for the heart default however slight so that even a small diminution of the amount of urine secreted will increase the concentration of urea in the blood and may quickly be followed by uraemia." In both false and true cardio-renal cases improvement in the action of the heart may give relief from the uraemic symptoms, but this relief is much more evident when the chief trouble is in the heart. One may crudely judge of the concentrating power of the kidneys in a given case by noting the colour and the specific gravity of the urine. If this be high coloured and the specific gravity good the kidneys are compensating for the decrease in output by concentrating, but if the colour be pale and the specific gravity low then this is not the case and uraemic symptoms may set in at any time. In thus judging it is best to use an average sample of the twenty-four hour output.

Physical tests are now much used in judging of the capacity of the heart for work, and it may be generally said that if the patient can do some extra work, such as ascending a definite number of steps or the raising of the feet from the ground a certain number of times while the patient lies on his back and the knees are kept extended, then the immediate prognosis is good. But it must always be remembered that there are two kinds of prognosis, the immediate and the ultimate, and although a man may pass well the physical tests and for the time-being have sufficient cardiac reserve, he may still have some lesion which will later interfere with the heart's sufficiency. Many a person who carries some cardiac disability which makes him hopeless as an insurance "risk" can for long do much hard work.

When cardiac failure exists the patient must be so rested that the heart is given the least possible amount of work to do. The amount of rest needed will depend upon the degree of failure. The severe cases should be kept absolutely in bed and may require some propping up when there. A Gatch frame is often of great service here. Sometimes the patient is more comfortable in an armchair and may be easiest when he is given a small table to lean forward on.

In very slight cases of cardiac insufficiency carefully regulated gentle exercise (always short of producing any distress) is often of value in improving the tone of the myocardium. In military practice it was noted that mild cases of organic heart disease benefited under physical exercises as much as did the numerous ones of functional disease. Special systems of treatment, such as the Nauheim (saline baths and resisted exercises) or the Oertel (gentle walking exercise up selected grades *plus* restricted fluids) have always as their aim the improving of the myocardium.

In all cases of heart failure the bowels should be kept freely open, best by the daily use of sufficient amounts of concentrated magnesium sulphate solution. Any straining at stool which may prove disastrous is thus avoided, the oede-

ma is lessened and toxins are removed. An occasional dose of some mercurial is also of value.

As regards diet, in severe cases it is well to give nothing by the mouth for a couple of days and then gradually commence again; all the meals should be small and more frequent than usual. Any distension of the stomach is sure to increase the distress. When oedema is great the total fluids should be restricted; in cases of this kind, especially when they show much toxaemia the Karrell diet is often invaluable. It consists in giving milk alone for some days, usually thirty-two ounces with no other fluid, and at the end of that time gradually adding dry toast, lightly boiled eggs, etc. When the digestion is very poor and it is hard to nourish the patient, alcohol and glucose should be remembered. Neither require any digestion and when absorbed supply the caloric needs of the sufferer to a large extent. When alcohol is thus used as a food it should be given in small frequent amounts. Mellanby[2] has shown that the human body can metabolize 10 cc. of alcohol per hour; if more than this is given at any one time the excess is excreted by the kidneys and may produce irritation here, or, circulating in the blood, may give rise to nervous disturbance.

There is practically no specific treatment for cardiac failure, unless, indeed, one excepts syphilitic myocarditis in which mercury and the iodides may possibly produce some improvement. Salvarsan is not indicated in these cases or should be only used with great caution and in minimal doses.

Symptomatic Treatment.—Often rest and careful dieting are sufficient to restore some of the reserve power of the heart, but usually digitalis is indicated, and there are few drugs in all the field of therapeutics that show such marvellous results when given properly in suitable cases. It is not known when digitalis was first used as a medicine. The date is certainly prior to 1597 for in that year Gerarde published his treatise on Foxglove. It appeared in the London Pharmacopoeia of 1650 and several other editions and was then omitted, and it was Withering who rediscovered it in the latter part of the eighteenth century and fully described its use in his book of 1785. Digitalis is of value in most cases of heart failure, whether the heart be regular or irregular, whether auricular fibrillation be present or absent, but its effects are specially pronounced when the pulse is fast, when there is oedema and cyanosis and when the urine is scanty.

Very frequently when heart failure is present it is associated, and indeed largely precipitated by auricular fibrillation, and it has been the teaching of many that it is only in such cases that its effects are pronounced. Under its influence the fibrillation is unaffected but a degree of heart block occurs and thus the ventricles are spared from many of the impulses that reach them in a disorderly shower from the auricles, and in consequence beat more slowly and hence more efficiently. Probably also the ventricles respond less easily to the impulses that do reach them as an early effect of the drug is to decrease the myocardial irritability. Many would have us believe that all the good effects of digitalis here are due to this slowing and G. A. Sutherland[3] goes so far as to say, "No slowing of the ventricular rate, no benefit from digitalis." But there are many, and with them I agree, who believe that although the slowing from heart block is of very great importance and probably is the chief cause of the good effects in these cases of auricular fibrillation, there is much evidence of a direct stimulating action on the heart muscle. In the first place, pharmacologists have repeatedly shown that the denervated heart beats more strongly under digitalis. Again, when the fibrillating patient is closely watched when being brought under the influence of digitalis it will be seen that the first effect of the drug is a lessening of the pulse deficit. If the heart be beating at say 140 per minute and the pulse at the wrist is only seventy there is a pulse deficit of seventy. On the day after the digitalis has been commenced the heart rate as counted through the stethescope will not have lessened and yet the pulse at the wrist will have increased, in other words, more of the beats are stronger than before and hence reach the wrist. In cases of complete heart block digitalis often hastens the ventricles which thus shows its direct action on the muscle. And lastly, many cases of heart failure with regular heart rate benefit by the drug, and sometimes even when the rate is not affected. Regular hearts with failing compensation while benefiting by the use of digitalis do not show the dramatic results that appear in cases of auricular fibrillation. Still they improve, the oedema lessens,

the venous engorgement of the different organs disappears and the patients are restored to a degree of compensation. The pulse rate usually is somewhat slowed, but, as already mentioned, this is not always the case and yet improvement occurs.

The pharmacopoeial dose of the tincture of digitalis is 5 to 15 minims, corresponding to ½ to 1½ grains of the leaf, but much larger amounts than this are usually used. In an average case 60 to 90 minims are necessary in the twenty-four hours. When a case of auricular fibrillation with a failing heart is put on such doses the first effect is, as above mentioned, a lessening in any pulse deficit. Next the heart begins to slow and about the same time diuresis sets in and along with this the oedema lessens and the venous engorgement of the various organs tends to disappear. The drug should be continued in the same dose until the true pulse rate has been reduced to about seventy per minute. Often, however, before this desired effect has been obtained some untoward symptoms set in which necessitate our discontinuing the medicine. The commonest of these is nausea and vomiting. Often when a case is first seen the stomach is already disturbed, due to the venous engorgement of its mucous membrane. In such cases the drug should be cautiously given in small doses and usually in a day or two the gastric discomfort disappears and the full dose can be employed. If however, the stomach proves obstinate the digitalis may be given *per rectum* in double doses or a small dose or two of strophanthin may be used intramuscularly or in bad cases even intravenously. It is best not to use more than 1/250 grain at a time. Other indications for stopping the drug are coupled beats(due to ventricular extrasystoles), diarrhoea, cerebral disturbance, or more or less stoppage of the urinary secretion. If these untoward effects do not appear we can go on with the full dose, and some patients require far more than do others before the desired effects appear. When once the pulse has been got down to about seventy the drug can be continued indefinitely in just the amount that is necessary to keep up the effect. Usually this is about 20 minims per day, but each patient is a law unto himself in this respect.

Guy's Pill, which consists of one grain each of powdered digitalis leaf, squill and blue pill mass, is often used and is specially valuable in cases with accompanying bronchitis and in those showing great venous engorgement of the liver.

Sometimes in cases of great oedema the desired diuresis does not set in and some diuretic should be used in addition to the digitalis. Often potassium acetate will serve but frequently it is not sufficient and one of the purin bodies should be tried. Either caffeine or diuretin (which is the double salicylate of theobromine and sodium) or theocin. This last is often very effective and should be given in five grain doses every four hours until forty grains have been administered. Occasionally the massive oedema of the lower extremities or a serous effusion must be removed mechanically and only after this is done will the digitalis act as a diuretic and then complete the removal of the fluid.

From time to time digitalis has been given in enormous doses. The Germans used to do this and in 1875 G. W. Balfour, in England, advocated as much as 70 minims every four hours in urgent cases. Lately Eggleston has systematized this "massive method" and gives 0.15 cc. per pound weight, after the probable weight due to the oedema has been deducted. This amount is given in twenty-four hours and the effects are more quickly obtained than with the smaller doses. But the patient has to be closely watched and it is very seldom that this method is required in private practice.

As a rule digitalis has little effect upon the blood pressure, but when in a case of previous hyperpeiesis the pressure has greatly fallen owing to heart failure the drug will tend to restore it to its former high level and the patient will feel the benefit.

Quinidine has been much used in recent years in cases of auricular fibrillation and in about fifty per cent of such cases it will at least temporarily restore the normal rhythm, but when the case is complicated with heart failure digitalis still maintains its position as the remedy *par excellence* for such failure. When the compensation has been regained by its use then, if thought advisable, quinidine may be used for the fibrillation.

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RECENT ADVANCES IN OUR KNOWLEDGE OF SCARLET FEVER*

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DURING the last two years rapid advances have been made in the elucidation of the etiology of scarlet fever so that to-day it is possible to state that a certain type of haemolytic streptococcus is the offending organism. The conception of the disease held at present is that this particular type of haemolytic streptococcus produces a throat lesion and while localized in this lesion elaborates a toxin which is absorbed into the circulation and produces the rash and the other characteristic features of the disease. Scarlet fever is thus analogous to diphtheria in the location of the organism in the throat and in the elaboration of a circulating toxin but here the parallelism ceases because certain graver features of scarlet fever are due to bacterial invasion; hence such complications as septicaemia arise.

The history of the work which has successfully filled in the gaps in our knowledge of this disease is most interesting. That the incidence of haemolytic streptococci in the throats of scarlet fever patients is high, has long been known. This fact immediately brought the haemolytic streptococcus under suspicion so that Marmorek in 1895 and Charlton in 1902, attempted to prepare curative sera by injecting horses with cultures of these organisms. The results of treatment were, however, indefinite and these therapeutic sera were abandoned. Jochmann in 1905 summarized the evidence for and against the specific etiological relationship of *S, haemolyticus* to scarlet fever and concluded that this organism was a secondary invader. He thought it unreasonable to suppose that a specific disease such as scarlet fever could be caused by an organism giving rise to such varied manifestations as the haemolytic streptococcus. He further stated that this organism could not be demonstrated in the throats of certain rapidly fatal cases of the disease. As no satisfactory method was thus elaborated to distinguish scarlet fever haemolytic streptococci from other types of haemolytic streptococci, no further advances were made at this time. In 1917 Schultz and Charlton[1] described a phenomenon of great interest. They found that sera of convalescent scarlet fever patients and that certain normal sera, when injected in 1 cc. amounts into the skin of scarlet fever patients at the height of the rash, produced a characteristic change; the rash became blanched at the site of injection and for several centimetres in this region; blanching developed five to six hours after injection and the rash in this pale area faded completely. The serum of convalescents developed this property of blanching the rash between the twenty-first and twenty-eighth days. Serum from cases in the acute stage of scarlet fever did not blanch the rash. The exact significance of this phenomenon was not grasped by Schultz and Charlton but Mair[2] who worked with the reaction in 1923 states: "Scarlet fever is apparently a general toxaemia and the rash only a manifestation of the toxin uniting with the tissue cells causing a capillary dilatation with swollen papillae. The serum injected, neutralizes the toxin in the tissues and causes the disappearance of the rash. The negative reaction of the sera of acute cases of scarlet fever is simply due to the fact that anti-toxin has not yet developed." Mair considered that the causal organism of scarlet fever must be capable of producing a toxin and that by immunization of animals with this toxin, an antitoxin capable of giving a positive Schultz-Charlton reaction would be developed. Mean-

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while evidence was accumulated to show that the haemolytic streptococci in the throats of acute scarlet fever cases were in a single immunologic group. Bliss[3] demonstrated the existence of haemolytic streptococci in the throats of 100% of scarlet fever cases. Bliss[4], Tunnicliff[5], Gordon[6], Stephens and Dochez[7], Eagles[8], and other found that about 80% of haemolytic streptococci, isolated from the throats of scarlet fever patients could be placed in a single group by the agglutination reaction and that similar organisms from other sources did not fall in this group. In view of the specific agglutinative properties of these organisms, Dochez[9], considered them very probably, the cause of scarlet fever; he believed that the haemolytic streptococci localized, in the throat, produced a toxin which caused the rash. He was unable to demonstrate the development of such a toxin in cultures and so attempted to imitate the conditions existing in acute scarlet fever cases. He injected agar beneath the skin of horses and after this had cooled, injected a living culture of the specific streptococcus into the centre of the agar mass. In this way the streptococcus was localized and growing *in vivo* so that the optimal conditions were obtained for toxin production. It was found that horses immunized in this way over a period of several months developed a serum capable of blanching the rash in acute cases of scarlet fever. By injecting guinea pigs in this way, he produced fever, leukocytosis and after two weeks extensive desquamation on the pads of the feet, he felt that he had produced experimental scarlet fever in guinea pigs.

Dr. and Mrs. Dick working from a different lead also came to suspect and finally proved beyond contention that a specific haemolytic streptococcus is the cause of scarlet fever. Their attention was directed to this organism by the fairly high percentage of positive complement fixation reactions obtained with scarlet fever sera, when this organism was used as the antigen. In 1921[10] the Dicks attempted to produce experimental scarlet fever in humans in various ways. They inoculated whole blood and serum from acute scarlet fever cases without any effect; they also swabbed the throats of volunteers with strains of haemolytic streptococci freshly isolated from the throats of scarlet fever patients. Thirty volunteers were inoculated in this way and eighteen different strains of haemolytic streptococcus were used. Seven cases only, developed sore throat, fever and leukocytosis but in no instance did a rash develop. At that time the Dicks felt that this series of throat inoculation experiments was large enough to discourage further experiments of the same kind with haemolytic streptococci. At a later date, however, this decision was reconsidered, and, it was felt that the experiment should be repeated with more carefully selected volunteers. As a result of this precaution we find the Dicks[11] in 1923, reporting two cases of experimental scarlet fever in humans caused by swabbing the throats with a haemolytic streptococcus obtained from a case of scarlet fever. Again in January, 1924[12], they reported another case of experimental scarlet fever produced by another strain of haemolytic streptococcus. In addition to reporting these cases of experimental scarlet fever the Dicks have shown that Berkfeld filtrates of media in which the specific haemolytic streptococcus is grown contain a toxin. This toxin in appropriate dilutions produces a positive skin test, in persons susceptible to scarlet fever, in relatively large doses it produces headache, chills, nausea and vomiting and scarlatinal rash in susceptibles and after a period of ten to fifteen days desquamation of varying degree. By appropriate dosage, susceptibles may be actively immunized so that a negative skin test results. Finally by injection of horses with large amounts of filtrate over a period of three months an anti-toxin is produced which neutralizes the toxin and which blanches the rash in acute cases of scarlet fever. Dochez working independently also came to the conclusion that specific haemolytic streptococcus was the cause of scarlet fever, but his work was less complete than that of the Dicks as he did not produce experimental scarlet fever in humans and he was unable to demonstrate the presence of scarlet fever toxin in media in which his strains were grown. He does not state what methods were used to demonstrate the presence of this toxin but it is likely that laboratory animals were used for this purpose. If this is so, the explanation is clear because the only animal we have encountered which is uniformly susceptible to the action of the toxin and which responds to injection with the formation of anti-toxin is the

horse. Dr. Dochez was kind enough to give us one of the strains of haemolytic streptococcus with which he worked and we have found that this organism compares favourably in toxin production with the strains which Dr. Dick has given us.

The organisms which we have been using for routine toxin production at the Connaught Laboratories are the two Dick strains which have produced experimental scarlet fever in humans. Culturally and morphologically these organisms are indistinguishable from hemolytic streptococci from non scarlet fever sources. One of these strains ferments mannite; the other does not. The essential characteristic which places these organisms in the scarlet fever group is that they are toxin producers and of course that they are capable of producing experimental scarlet fever in susceptible humans. Up to the present we have encountered no toxin producers among organisms derived from non-scarlatinal sources, but it is to be expected that toxin producers will have a widespread distribution and that they will be capable of producing the same lesions as the non-scarlatinal organisms. Williams[13] has reported the isolation of scarlet fever haemolytic streptococci from a wound, from the throat of a patient with measles and from a case of osteomyelitis. These strains produced toxin which was neutralized by the serum of scarlet fever convalescents. We have tried haemolytic streptococci from cases of septicaemia and from pus from the pleural and peritoneal cavities, but have not obtained toxin production in this group. We have, however, obtained uniform toxin production with strains of haemolytic streptococci which Dr. Eagles isolated from throats of scarlet fever patients and which are placed in a single group by the agglutination reaction.

Toxin production occurs in both solid and fluid media. The solid medium used is agar to which broth and sheep or horse blood is added when melted. The broth ensures a large amount of condensation fluid, the blood acts as an enriching agent. After four to seven days' growth the condensation fluid is poured off and filtered. The filtrate contains the toxin in high concentration. The fluid medium used for toxin production is plain broth of PH 7.4 to 7.6 containing 10% sheep's blood. The toxin produced in this medium varies from ½ to 1/10 the concentration of toxin produced on blood agar. We have found that toxin production occurs equally as well in buffered broth and in hormone broth and that the choice of enriching medium is not very limited. The best broth toxin is obtained with 10% blood as the enriching medium but we have had good toxin when ascitic fluid alone and glucose alone in buffered broth are used as enriching agents. Within the limits of growth the reaction of the medium has but slight effect on toxin production, the toxin produced in broth of reaction PH 7.0 comparing favourably with that produced in broth of reaction PH 7.5. It appears therefore that toxin production by any particular strain of scarlet fever streptococcus is a singularly constant phenomenon. It is to be expected, however, that individual strains will vary in their ability to produce toxin, some being potent toxin producers and others feeble toxin producers.

Scarlet fever toxin is much more thermostabile than diphtheria toxin and is only destroyed when heated at 90° C for one hour. The addition of 0.5% phenol does not influence the ability of the toxin to produce positive skin tests but evidence[14] is accumulating to show that it does impair the immunizing power of the toxin. Toxin produced by the growth of the organism in blood agar is quite concentrated and 1/10 cc. is capable of producing positive skin tests in susceptibles in dilutions as high as and higher than 1:10,000. For routine skin tests 1/10 cc. of 1:2,000 dilution of toxin is used. No animal has been found which gives positive skin tests with such high dilutions of toxin. The rabbit reacts uncertainly to a 1:100 dilution and the dog fairly regularly to a 1:100 dilution; furthermore it is not possible to kill rabbits or guinea pigs with massive doses of toxin and attempts to produce anti-toxin in these animals with injections of toxin have not been successful. Subcutaneous injection of toxin in horses results in a local inflammatory reaction and fever; after repeated injections of toxin, anti-toxin can be demonstrated in the blood. Persons giving a positive skin test with high dilutions of toxin may be actively immunized by three subcutaneous injections of toxin at five day intervals. The doses usually given are 1 cc.,

2 cc. and 2 cc. of a 1:200 dilution. Constitutional reactions are not unusual and consist of chills, headaches, nausea and vomiting. With somewhat larger doses of toxin a scarlet fever rash may be produced with desquamation occurring about two weeks later. The skin test becomes negative after active immunization. Whether a course of active immunization of sufficient length to produce a negative skin test will give complete protection against scarlet fever can only be determined by time. The indications are that complete protection is obtained. Toxin standardization is a difficult problem because laboratory animals cannot be used for this purpose. The method employed at present is to try varying dilutions of a new toxin and of a toxin of known strength on susceptible humans—a procedure which is quite harmless to the patient but which is time consuming. The skin test for susceptibility to scarlet fever has rightly been called the Dick test. This test consists of the intracutaneous injection of 1/10 cc. of a 1:1,000 or 1:2,000 dilution of agar toxin and also of a heated control of the same dilution. The positive reaction begins to appear in from four to six hours and reaches its maximum size and intensity within twenty-four hours after injection. There is a local area of redness varying from 10 to 50 mms. in diameter; induration may, or may not be present. At the end of twenty-four hours the positive Dick test corresponds in appearance to the positive Schick reaction at its height on the fourth day. Zingher[15] who has done an extensive series of Dick tests in New York finds that the results with this test in normal persons indicate that the percentage of susceptible persons by age groups and social status resembles closely the similar percentage of persons susceptible to diphtheria noted with the Schick test. In a series of 141 scarlet fever cases tested by Zingher a positive reaction occurred in each in the early stages of the disease. Of 170 cases tested during convalescence, 158 gave a negative Dick reaction. Our results with the Dick test in Toronto, are quite comparable to those of Zingher, but the series of cases tested has been much smaller; however, our opinion from a limited experience is that this test is all it is claimed to be and that it is of great importance epidemiologically.

By no means the least fascinating aspect of the Dick researches, is the development of a scarlet fever anti-toxin. It seems singularly fortuitous that the only animal which regularly responds to the injection of toxin by anti-toxin production is the horse. The method of immunization adopted by the Dicks is to give horses gradually increasing doses of filtrate from blood broth in which the organisms are grown. The filtrate is given at weekly intervals, the initial dose being 25 cc. and the dose being doubled each time till 1 litre is reached, when no further increase is given. All injections are given subcutaneously. The horses respond to injection with a local inflammatory reaction and a general febrile reaction. A three months' course of immunization at least, is usually required to give a serum of satisfactory potency. A serum of such strength that 1/10 cc. of a 1:10 dilution will completely neutralize ten skin doses of toxin is considered strong enough for concentration. The anti-toxin is concentrated by the method which is used for diphtheria anti-toxin concentration. The final product is purely anti-toxic and in no way bactericidal. Anti-toxin may also be produced by the method of Dochez which has already been outlined, but in our hands this method, up to the present, has proved less satisfactory, as the serum has not been of satisfactory anti-toxic potency and the horses develop troublesome abscesses. It is, however, possible that perseverance with the Dochez method may yield a serum combining anti-toxic and bactericidal properties and if such a serum could be obtained with good concentration of both types of anti-body it would be highly desirable. The reason for this is obvious as scarlet fever is a combined toxic and bacterial infection in which many of the graver complications are due to bacterial invasion. It is hardly to be hoped that anti-toxin alone will directly prevent bacterial invasion but it is quite possible that it may do this indirectly by neutralizing the effect of the toxin on the tissues and so increasing the ability of the tissues to produce bactericidal anti-bodies; but once bacterial invasion has occurred a bactericidal serum becomes highly desirable.

Anti-toxin has not yet been used in Toronto for the treatment of cases of scarlet fever, but we hope soon to have a sufficient amount of our own anti-toxin to allow this work to be started. True appraisal of the value of this therapeutic

agent can only be obtained under the most carefully controlled conditions and over a long period of time, so that not only its effect on the mortality rate may be noted, but also its effect on the length of the disease and perhaps most important its effect on the incidence of complications. It is of course well known that epidemics vary in severity in different locations and at different times. To meet this difficulty the Dicks are dividing the cases of scarlet fever into two groups, severe and mild. Every second case in each group gets anti-toxin so that for every treated case there is an untreated case to act as a control. In this way it is hoped that the exact efficiency of the anti-toxin may be ascertained.

In conclusion, I should like to emphasize the importance of the recent researches in scarlet fever, not only because the cause of this disease has been discovered, but also because of the weapon we have for its control in the Dick test, and finally because of the production of an anti-toxin which, it is hoped, will be of great therapeutic value. I should like to take this opportunity of thanking Professor Duncan Graham and Dr. Alan Brown, for the use of clinical material at the Toronto General Hospital and the Hospital for Sick Children. This has greatly facilitated the work in every way, and most particularly in the standardization of toxin and of anti-toxin.

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Surgical Treatment of Acute Pulmonary Abscess and Chronic Pulmonary Suppuration.—Carl A. Hedblom, Rochester, Minn., has analyzed the cases of acute abscess and of chronic pulmonary suppuration observed at the Mayo Clinic. Twenty-one per cent followed operation, usually an operation under general anesthesia. The treatment, to be rational, must be based on the clinical course and on the pathologic anatomy of the suppurative process, which is of several types and presents many variations. Expectant treatment is indicated during an associated pneumonia and in the incipient stage of the abscess in all cases. The end of the incipient stage is usually marked by the sudden onset of purulent sputum in large amounts. Expectant treatment is indicated also in all cases in which there is progressive improvement, and in which patients do not become steadily worse during a period of from one to two months. If the abscesses are multiple and widely distributed, and in cases in which a purulent pneumonic process or pleural thickening make localization uncertain or impossible, there is also no other alternative but to treat the patient expectantly in the hope that improvement will occur, or that localization will later be possible. Localized uncomplicated abscesses that do not show unmistakable signs of improvement after a limited time should be treated surgically. The principles involved in surgical treatment are the promotion of drainage through the bronchus, drainage through the chest wall, and extirpation of the diseased portion of the lung. These results are obtained by pneumothorax collapse, extrapleural thoracoplasty, thoracotomy and lobectomy. Operations based on each of these principles have their particular indications. Hedblom considers exploratory aspiration for localization of an abscess without preliminary thoracotomy, to prevent infection of the pleural cavity, an unjustifiable procedure because of the risk of contaminating the pleural cavity. The results from drainage operation for peripherally located abscesses, in view of the fact that the cases were chronic, with more or less extensive secondary lesions have been relatively satisfactory.—*Jour. Am. Med. Ass.*, Nov 15, 1924.

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PERNICIOUS ANAEMIA: ETIOLOGICAL CONSIDERATIONS, WITH REPORT OF A SERIES OF EXPERIMENTS

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THE symptom-complex of weakness, lemon-tinted skin, approximate preservation of weight and an anaemia, with high index and anisocytosis,—known as pernicious anaemia—is now recognized by the best authorities, as a clinical entity. So also, the autopsy picture—lemon-coloured fat, intense redness of the skeletal muscles, fatty degeneration of various organs, accumulation of iron pigment in the liver, spleen and kidneys and megaloblastic bone-marrow hyperplasia— is recognized as a pathological entity. Both entities, clinical and pathological, strongly suggest that the tissues have been affected, over a prolonged period, by a poison containing both haemotoxic and neurotoxic elements. Convinced that the disease must have one and only one cause, research seeks to establish, if possible, the nature and source of the hypothetical toxin.

Research must be guided by a consideration of symptoms, as well as by certain reflections upon the course of the disease and the results of treatment.

Phenomena referable to the digestive tract—glossitis, pyorrhoea and alveolar abscess, achlorhydria and diarrhoea,—form a large fraction of the total symptomatology and give the alimentary system a prominent place in etiological considerations. Glossitis, though common, is probably not so constant as Hunter[1] has claimed. Dental infection plays no necessary, immediate rôle, since many edentulous individuals develop the disease. The practically constant achlorhydria must be either a result of the disease or a phenomenon intimately associated with the cause. It is probably not the cause, *per se*, since there are many more persons with achlorhydria than with pernicious anaemia. The prolonged diarrhoea so frequently occurring before the disease is established, may be due to a rush peristalsis occasioned by the premature emptying of the achylic stomach, although this explanation is rendered less valid by the fact that the symptom is temporary, while the achlorhydria is constant. It may, on the other hand, be due to an infectious enteritis, a conception favoured by some authorities; and those patients who have had severe diarrhoea previously, may in an especial degree show, during the established disease, continued nausea, vomiting, anorexia, and epigastric pain. But the majority of patients, in spite of achlorhydria, are remarkably free from dyspepsia, until late in the disease, when gastric atony and stasis afford a sufficient explanation for its frequent presence.

The spinal cord symptoms may appear before, during, or near the end of the anaemia, and result from a degeneration due to some poison—certainly not from the anaemia itself. The numbness and tingling of the extremities with its element, as one patient expressed it, of "exaggerated sensitivity," is probably due, as a rule, not to cord changes, but to a peripheral neuritis. Hamilton and Nixon[2] demonstrated peripheral nerve degenerations.

The blood shows a marked degree of anisocytosis and with it a high percentage of macrocytes which are, as Hurst[3] recently pointed out, the really distinctive features of the blood-picture. The over-sized, undersized, and misshapen red cells are almost universally regarded as the faulty products of an overtaxed marrow. The disabling strain on the blood-forming organs is caused partly by their effort to make good the blood losses from haemolysis, and partly by direct intoxication with the hypothetical toxin responsible for the haemolysis. (The older school, initiated by Ehrlich, regarded the whole disease as one of the bone-marrow—a conception recently revived by Piney,[4] but not very generally accepted).

The startling and mysterious remissions do not represent nearly so close an approach to normal as usually supposed. The blood itself never rises to its healthy level, careful micro-

meter measurements of the red cells show definite continuance of anisocytosis, and the return of bodily vigour is but partial. Interpreted in the light of the toxic theory, a remission might be regarded as a period of greatly lessened intoxication, or a period of antitoxin response on the part of the body. The best that treatment has ever achieved is a remission, since no case has been demonstrated to have been cured.

While probably remissions depend essentially on a mechanism beyond our understanding and control, they may be unquestionably assisted by almost any rational treatment, a fact which never ceases to inspire unwarranted optimism. Some of the most brilliant, if temporary, therapeutic results have been obtained by various treatments directed toward the gastro-intestinal tract, e.g., tooth extraction, milk diet, high carbohydrate and low protein diet, purgative diets, purgative drugs, intestinal antiseptics, colon irrigations, the implantation of aciduric bacteria, e.g. *B. bulgaricus* and *B. acidophilus*, and the administration of dilute hydrochloric acid. The writer's personal experience with every one of these forms of treatment has resulted in the adoption of a conservative attitude, because none of them is more than helpful. The oral administration of *B. acidophilus* and lactose has formed the subject of a therapeutic experiment on ten patients during the term 1923-4. While the writer hopes to publish the results in detail it may be briefly stated that three showed no improvement whatever, two had remissions but relapsed while taking the cultures, four went into and are still in remission (six months), and one, who was already in remission, relapsed while taking the cultures. *B. acidophilus*, especially when grown on milk and the whey portion alone used, is almost a specific symptomatic agent for combating the nausea so frequently present, and often helps to produce good remissions. One effect of the treatment is to reduce the numbers of *B. Welchii* in the stools very rapidly to few, or none.

Extensive experimental work on pernicious anaemia has resulted in the production of somewhat similar blood pictures in animals by the use of various agents. Thus, Bunting[5] obtained it by injecting small doses of ricin over prolonged periods; Rothman produced it, as well as the cord changes, by injecting pyridine; Brinkman and Szent-Györgyi[6], obtained the blood picture by injecting linoleic acid intramuscularly. Seyderhelm[7] very recently got a similar picture by the use of an extract of pernicious anaemia stools, while an extract of normal stools failed to give the same picture. It should be pointed out that any faecal extract must be proved capable of absorption from the intestine, as well as capable of causing blood pictures. In a series of thirty-five unpublished experiments the writer introduced heavy distilled water suspensions of fresh pernicious anaemia stools into carefully isolated intestinal loops of animals under ether, and collected portal blood during the period of physiological absorption. The serum of this portal blood was then titrated *in vitro* against standard blood emulsions to detect haemolytic activity, while controls of normal heart-blood serum from the same animal were run in each case. Pernicious anaemia stools sometimes gave evidence, and sometimes did not, of an absorbable, haemolytic substance. Fresh normal stools gave no evidence of an absorbable haemolytic substance. Normal but stale stools and stools from constipated persons yielded an absorbable haemolytic substance. Altogether, there was no evidence of any constant or specific haemolytic substance in pernicious anaemia stools, that could be absorbed by an animal intestine.

The many theories of etiology embrace a number of different conceptions; the absorption of toxic amines; the presence of increased unsaturated fatty acids; infestation with protozoa; endocrine disturbance; and bacterial infection, to mention but a few. The inadequacy of all these theories lies in the lack of demonstration of any actual connection between the conceptions and the disease. Hunter, while favouring sepsis, did not apparently designate any individual organism. Hurst[8], recently mentioned a streptococcus, which, in the majority of cases, he is able to isolate from the duodenum of patients, but his failure thus far to demonstrate any causative rôle on the part of this organism, robs the finding of immediate importance. Herter's[8] bacteriological investigation of the stools of pernicious anaemia showed that *B. Welchii* (*B. perfringens*, *B. aerogenes capsulatus*) or its spores, were numerically in-

creased as compared with normal stools or the stools in other diseases. Simonds[9] confirmed this work. Herter very tentatively suggested the hypothesis that *B. Welchii* might be the cause of the disease, evidently meaning that in doing so it led a life confined to the lumen of the intestine, while its harmful growth products were absorbed into the circulation. This is merely a more specific application of the widely held idea that the gastro-intestinal tract by "auto intoxication" causes the disease. At present we know of no symptom-complex, honoured by the name disease, which is proven to be caused by the absorption of poison from the lumen of the intestine. The actual invasion of the intestinal wall by *B. Welchii* would form an hypothesis distinct from, and more specific, than Herter's. The writer felt that an effort should be made either to substantiate Herter's hypothesis or, if possible, definitely to dismiss it, an undertaking which hasoccupied the past year, and to a brief description of which the present article is now devoted.

An attempt to implant *B. Welchii* in the intestines of dogs, resulted in an early finding of considerable interest. Whether the cultures were fed by mouth or injected into the duodenum, the majority of the dogs showed four or five days after such introduction, a blood picture characterized by a moderate fall in haemoglobin and red cells and, chiefly, by a morphological disturbance of the erythrocytes. Definite anisocytosis (variations in size) and moderate polychromatophilia (basic staining) remained, until the 9th or 10th day, at which time their gradual disappearance coincided with regenerative signs (nucleated reds), the return of the red count to normal or above, and the return of the haemoglobin to nearly normal. This phenomenon, though transient, in spite of the continued feeding of the culture, was of interest, because the morphological changes described are those recognized as most characteristic of pernicious anaemia.

The dogs which showed this phenomenon showed also reactive clinical symptoms, chiefly diarrhoea; sometimes intense, and with fever. Consequently one adopted the theory that probably the anaemia was related to an actual invasion, slight though it must have been, of the intestinal tissues, a theory supported by the necropsy finding of definite areas of gastritis and enteritis which microscopically showed an occasional bacillus in the wall. The logical procedure was to investigate the tissue reactions of *B. Welchii*. It was already known that this organism, by virtue of its well-proven pathogenic properties, played the essential causative rôle in gas gangrene, and it has been supposed that an experimental inoculation into the tissues produced either gas gangrene or nothing. It is the chief object of the present research to show that this conception is false. The subcutaneous injection of a sufficiently numerous and sufficiently virulent culture into a susceptible animal (guinea-pig or pigeon), especially in the presence of traumatized tissue, does undoubtedly, produce definite gas gangrene. But the subcutaneous injection of a culture less numerous or less virulent, or both, into a susceptible and especially a less susceptible animal (rabbit) and particularly in the absence of tissue trauma, produces no gangrene, and usually insufficient gas to be clinically noticeable. A superficial observation of such an inoculated rabbit, even for a period of a week, might lead to the conclusion that the animal had entirely overcome the infection. But a prolonged and careful observation over a period extending even to two or three months, reveals definitely that *the animal, while exhibiting no initial acute symptoms, is nevertheless suffering from a chronic infection.* This statement is based partly on a train of symptoms presently to be described, but chiefly upon the ability to recover the organism in pure culture from various organs immediately after death. Out of a series of fifty rabbits variously inoculated with *B. Welchii*, only one rabbit failed to show symptoms and yielded negative cultures of its organs. All the rest have either died or still show symptoms, and in all cases, where autopsies and cultures have been made, *B. Welchii* has been recovered.

Without too detailed a report, the following facts may be stated. A rabbit suitably inoculated with a sufficiently numerous and virulent culture will show, sooner or later, depending on the site of inoculation, a blood state characterized by (1) a fall in haemoglobin of varying degree, but such that the normal level is not (so far as these experiments went) ever regained. (2) A drop in the red count of varying

degree with irregular gains and losses during the course of the infection. (3) A colour index, showing a tendency to remain near one or to exceed one. (4) An irregular behaviour of leucocytes, but such that in spite of fluctuations, the granular leucocytes show greater numerical variations than the lymphocytes. These facts indicate that the chronic infection by *B. Welchii* produces continuous anaemia. Sometimes the course of the disease is short and its character acute, in which cases the anaemia may be profound. At other times the course is prolonged (six to twelve weeks), the symptoms are less marked, and the anaemia moderate. Terminal events, appearing usually a week or ten days before death, are convulsions and diarrhoea. The convulsions are in some cases apparently due to a *B. Welchii* meningitis; in other cases unexplained, and in any case are tetanic in character, the animal going into opisthotonos. The diarrhoea is of a severe dehydrating type, and is sometimes accompanied by loss of sphincter control. A few animals, after or without convulsions, show terminally exaggerated knee-reflexes and dorsal retraction of the tail in addition to the sphincter-paralysis. Death sometimes takes place with evidence of increasing weakness and respiratory difficulty, while it sometimes occurs during a convulsion. Death is probably due to the action of the toxin upon the central nervous system, and not in any one case to the anaemia *per se*. The only other symptom requiring mention is loss of weight, which is frequently extreme. The pathology as revealed by autopsy is slightly different in different animals. Some show moderate fatty degeneration of the liver, while a few show extreme fatty degeneration of the liver, as well as moderate fatty degeneration of the heart and kidneys. The bone marrow as a rule loses its normal slightly purplish colour and becomes more frankly red, while microscopically it shows great erythroblastic activity, the fat being to a great extent replaced by active haemopoietic tissue, showing a high percentage of megaloblastic, as compared with normoblastic, cells. In some of the most chronic cases the muscles at death show an intensification of their red colour, resembling that seen in pernicious anaemia, although in these animals the wasting may be a sufficient explanation. To date there has been no achlorhydria, or any considerable fall in the gastric acid curve, nor have there been any regenerative phenomena deserving comparison to a remission, as seen in pernicious anaemia, although some of the animals living were inoculated three months ago.

Of chief interest, so far as the blood is concerned, is the morphological disturbance of the red cells. If a living culture (say 1 cc. of a moderately virulent strain) be injected into the spleen of a rabbit, one will find often within six to twelve hours, by examination of a smear of the blood taken from the ear, the presence of a large number of microcytes, with some macrocytes, many of the latter taking a faint basophilic stain. Within two or three days the number of the macrocytes is greater and of the microcytes less, and as time goes on, until the animal's death, a similar picture continues, with either microcytes or macrocytes dominating. This is, so far as I have investigated, a specific effect of the *B. Welchii*. Thus, the intra-splenic injection of other organisms (*B. coli*, *Streptococcos haemolyticus*, *Staphylococcus haemolyticus*, and the *Pneumococcus*) causes no blood change; nor is any blood change occasioned by the intrasplenic injection of boiling water, 95% alcohol, 1% N. butyric acid, or by the removal of the spleen. If, before injecting 1 cc. of culture, it be mixed and allowed to stand with 1 cc. of *B. Welchii* antitoxin, no immediate abnormal blood picture results, although a delayed one appears two weeks later. This temporary inhibition of the blood picture by anti-toxin is also a specific action, since no delay is caused when the culture is mixed with anti-tetanus, anti-pneumococcus, anti-meningitis, or normal horse serum. The blood picture is therefore due to the operation of *B. Welchii* toxin, and probably to the toxin formed *in vivo*, since the intrasplenic injection of fresh living bacilli from a plate gives the prompt morphological disturbance. Bull and Pritchett[10] were the first to demonstrate that *B. Welchii* toxin is a true exotoxin and is responsible for most, if not all, of the pathological manifestations of the organisms. If the inoculation be made subcutaneously no abnormal blood picture occurs for from ten days to three weeks—a delay not at present explainable, although presumably explained by the fact that the microorganisms are

being disseminated throughout the various organs of the body.

The morphological changes in the red cells, as here described, are apparently due to the effect of a toxin acting directly on the red cells, without the intermediate agency of any organ or substance. For, if the two external jugulars of a rabbit under urethane anaesthesia be completely tied off from the general circulation and into one be injected a few drops of toxin, its blood will show after forty minutes or longer, definite anisocytosis, while the blood of the control vein shows no morphological change. More striking still is the fact that defibrinated blood, or even washed erythocytes, treated with toxin *in vitro*, will show anisocytosis after a similar period of incubation. This effect of toxin on red cells, *in vitro*, is not peculiar to rabbits' blood, but occurs with the blood of mice, dogs, cats, guinea-pigs, and man.

Consequently, in order to obtain this blood picture of anisocytosis, the only postulate is that sufficient toxin exists in the body, the site of its manufacture (focus of infection) being a matter of relative unimportance.

Micrometer measurements of the red cells before inoculation, and at varying periods afterwards during the course of the disease, give definite data regarding what actually is taking place. In the average case the changes may be thus tabulated:

1. A few hours after splenic inoculation, there appear 1 or 2% of microcytes and a smaller number of macrocytes, while the average diameter of the cells slightly decreases.

2. Within three or four days, the macrocytes may go up to 5%, the microcytes descend to 0.5% and the average diameter of the cells increase 0.5% above normal.

3. After the first two weeks, one of two courses may be followed.

(*a*) The average diameter may again drop below normal with a preponderance of microcytes above macrocytes, and remain thus until death.

(*b*) The average diameter may remain above normal, with preponderance of macrocytes above microcytes, until just before death.

4. In any case, the accumulation of toxin before death—and which, presumably, causes death—causes the average diameter once again to drop below normal.

When an animal is inoculated subcutaneously, the same changes occur, but a delay of from ten days to three or four weeks usually occurs, as stated above.

Space allows the reproduction of only one chart, in illustration.

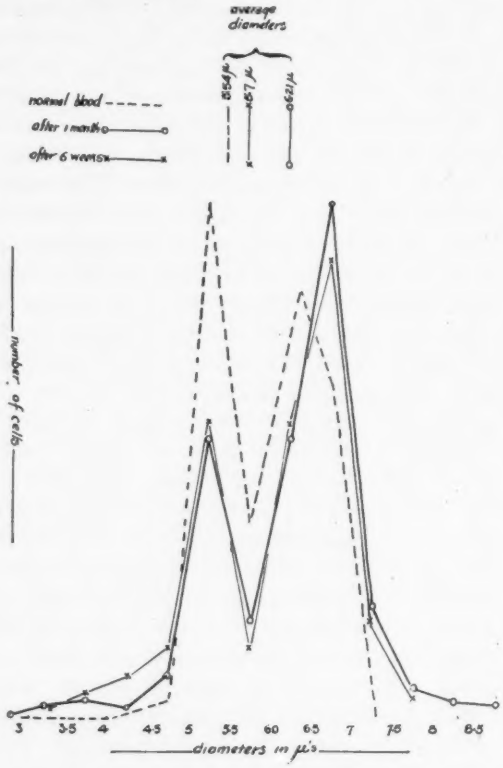

CHART I.

The ordinates represent the number of cells, the abscissa the diameters (in *microns*) of the cells. The broken line shows the diameter incidence of the normal blood. The line with circles represents the blood one month after infection. The line with crosses represents the blood six months after infection. After infection one notes the appearance of microcytes and macrocytes, also the shifting to the right of the high peaks. The average diameters are represented by the lines at the top of the chart. In each case the graphs are drawn from a 500 cell micrometer measurement.

Discussion

The phenomenon of anisocytosis observed in rabbits suffering from an experimental infectious anaemia from *B. Welchii*, is due mostly, no doubt, to the direct effect of its toxin on the red cells of the general circulation. This

does not preclude the possibility of a joint effect of the same toxin on the blood-forming tissues. The exponents of the various theories of the etiology of pernicious anaemia are divided into two schools (*a*) those for whom it is a disease of the blood-forming organs (*b*) those who believe that the disease is due to the action of a haemolytic toxin *on the blood.* The latter school explain the bone-marrow changes as secondary, and due to exhaustion in the effort to make good the losses sustained in the general circulation. But few are ready to believe that the anisocytosis can be due to a direct action of toxin on the red cells of the general circulation, since it has always been regarded as a sign of defective blood formation by an injured marrow.

In these experiments, which of course have no proven relationship to the disease, anisocytosis occurs before any serious bone-marrow damage can have been done and it occurs, as stated, *in vitro.* These facts alone must at least make us cognizant of a hitherto unrecognized property of *B. Welchii* toxin.

The experimental blood picture obtained, though resembling that of pernicious anaemia, is not sufficiently severe to be absolutely convincing, a short-coming which might be explainable by the limitations of experimental data in general. The many possible variants, viz., the virulence of the organism, the strain of the organism, the numerical strength of the dose, and the individual susceptibility of animals, render experimental results difficult of interpretation. We know very little regarding the susceptibility of human beings to *B. Welchii* toxin, although certain indications point to a greater susceptibility in man than in rabbits.

The problem of proof for the hypothesis herein advanced, viz., *that pernicious anaemia may be the bodily reaction to B. Welchii toxin* is an especially involved one. The finding of *B. Welchii* at autopsy does not settle it, since in many cases, other than pernicious anaemia, this organism may be found in the liver and possibly other organs, after death. Nevertheless, the author wishes to make a plea for the search. In three autopsies, *B. Welchii* has been found in two cases in the spleen, and not found anywhere in the third. It should be remembered that, if the disease *were* due to *B. Welchii*, the organism might conceivably be restricted to local foci (e.g. alveolar pockets, prostate, cervix uteri, or even the wall of the intestine) and exert its general influence by its well-proven, soluble, haemolytic exotoxin. In two cases during life, *B. Welchii* was isolated from pyorrhoeal pus (the only two cases culturally examined to date). Evidently, in a few cases, other than pernicious anaemia, e.g., a case of miliary tuberculosis reported recently at the Liverpool Medical Institution[11], there has been found a terminal disturbance of blood morphology suggestive of pernicious anaemia, together with the presence of *B. Welchii* in the liver. The author had a similar experience recovering *B. Welchii* from the liver in a case of auricular fibrillation at the Toronto General Hospital.

Authorities are fairly agreed that pernicious anaemia is caused by a toxin and many investigators favour also the idea of an infection; the two conceptions not being necessarily incompatible. But it should be emphasized that if an infection causes this disease, it must be an infection of a special kind, different from most known chronic infections. It would probably be an infection by an organism producing a moderately powerful, soluble poison, with neurotoxic, as well as haemotoxic properties. The necropsy findings show no type of tissue reaction such as might be produced by any familiar, chronic infective agent—there are no abscesses, no granulomata, no fibrous condensations. Just as *B. tetani*, from an insignificant focus, sends forth a soluble neurotoxic and haemotoxic substance to cause destructive changes at great distances, so in pernicious anaemia, the infection may possibly conform to this type. *B. Welchii*, the only microörganism ever seriously designated (Herter) is, like *B. tetani*, an anaerobe, with an exotoxic poison. The writer's experiments prove that *B. Welchii* can produce a chronic infection and strongly suggest, as well, that its poison has a neurotoxic element.

The writer's thanks are due and gratefully expressed to Prof. V. E. Henderson, in whose department this work was done, to Prof. F. G. Banting, under whose chair of medical research, he obtained a fellowship, to Dr. J. G. Fitzgerald, and Dr. R. D. Defries, for many courtesies, and to Mr. Henry Leeds of Atlantic City, whose financial assistance helped to make the undertaking possible.

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THE CAUSE OF THE MATUTINAL ALKALINE TIDE OF THE URINE*

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THE fact that variations in the reaction of the urine occur has been known for a long time. The causes of these variations are, however, still a subject of dispute. The first recorded observations on the subject were by Bence Jones[1] in 1845. He observed that urine passed from two to four hours after breakfast was more alkaline than at other times and ascribed this alkalescence to the effect of the secretion of hydrochloric acid into the stomach as a result of the meal. Similar observations have been made since by various investigators but there is lack of agreement regarding the explanation of the "alkaline tide" which occurs during the early part of the day.

Dodds[2] states that the only constant alkaline tide in the urine appears after the first meal of the day, a consequence, apparently, of the secretion of hydrochloric acid into the stomach and is followed later by an acid tide, due presumably, to the secretion of alkali below the pylorus. He was unable, however, to discover any quantitative relationship between the amount of acid secreted and the extent of the urinary changes.

Leathes[3] had previously noticed that the only constant "alkaline tide" occurs during the morning but suggested a different explanation for its occurrence. He correlates it with the respiratory functions rather than with the digestive functions. During sleep, there is a natural depression of the respiratory centre resulting in a mild, physiological acidosis. Consequently, the kidneys during the night excrete an acid urine. In the morning, on waking, arising and resuming the duties of the day, the respiratory centre becomes reactivated; CO_2 is washed out of the lungs leaving the blood with a tendency towards alkalosis. The kidneys respond by the excretion of a urine which is alkaline. In certain cases of renal insufficiency this morning alkaline tide fails to appear[3,4]. Campbell[5] says that an alkaline tide is the rule about three hours after any meal. Hubbard Munford and Allen[6] also attribute the morning alkaline tide to the effects of gastric secretion, which is not in accord with the findings of other observers[3,7].

Methods of Investigation.—In this paper, are presented the results of some experiments which were carried out in an attempt to arrive at some more or less definite conclusions regarding the physiological explanation of the morning alkaline tide which is a constant occurrence in the urine under normal conditions.

The method used for determining the reaction of the urine was that described by Leathes[3]. Its basis is the fact that the urine reacts like a solution containing both mono-

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and di-basic phosphates. A measured volume of urine (10 cc.) was diluted with two volumes of water and there were added two or three drops of phenolphthalein indicator and five or six drops of methyl orange indicator. The mixture was then titrated with 1/10 normal H_2SO_4 to the turning point of the methyl orange, then with 1/10 normal NaOH to the turning point of the phenolphthalein. The result of the first titration gives the equivalent of the alkaline phosphates, while the second titration represents the total phosphates. The percentage of the total phosphates in the form of alkaline phosphates is designated the "alkalinity per cent." Calvert, Mayrs and Milroy[8] found this method to compare favourably with P_H determinations for purposes of detecting alterations in the reaction of the urine.

The samples of alveolar air were obtained by expiring deeply, at the end of an ordinary expiration, into a glass tube, about one inch in diameter tapering to one half this size at one end and having attached here a piece of rubber tubing as a mouth-piece. The tube dipped into a jar of acidulated water. After the air in the tube had been replaced by alveolar air, the end of the mouth-piece was sealed with the tip of the tongue and then clamped. The alveolar air was then transferred to a Haldane gas analysis apparatus and the CO_2 estimated.

Relation of Reaction of Urine to Alveolar CO_2.—Dodds[9] has shown that the alveolar CO_2 tension rises after a meal, reaching a maximum of from 2 to 6 mm. Hg. in one-half to one hour; it then falls to a minimum of about the same extent below the fasting level, in one and a half to two hours. The rise in alveolar CO_2 pressure is ascribed to the secretion of HCl into the stomach, leaving the blood with a relative excess of base. The fall is attributed to the opposite condition, that is, the secretion of alkali below the pylorus.

Since the kidneys respond quickly to alterations in the acid-base equilibrium of the blood, the alkaline tide, if any, resulting from gastric secretion must, of necessity, be of short duration and soon counteracted by a change in the opposite direction and so likely to escape detection, unless samples of urine are collected at quite short intervals after the meal.

TABLE I

Relation of reaction of Urine to Alveolar CO_2—with food.

Time	*Volume of Urine (cc. per hour)*	*Reaction of Urine (Alkalinity per cent.)*	*Alveolar CO_2 (mm. of Hg. pressure)*
6.00 a.m.	—	—	44.5
10.00 p.m. to 8.00 a.m.	18.0	47.8	40.6
8.00 a.m. to 9.00 a.m.	28.0	56.6	43.4
9.00 a.m. to 10.00 a.m.	28.0	44.8	38.4
10.00 a.m. to 11.00 a.m.	53.0	75.4	40.4
11.00 a.m. to 12.00 m.	95.0	88.5	40.6

Expt. 17. 11–6–23. Breakfast at 8.45. First specimen alveolar air obtained at 6.00 a.m. in bed before rising.

By reference to table I., it is seen that the alveolar CO_2 was high immediately on waking, as found by Leathes[3] and others[10] but showed a fall after the subject had arisen from bed. A second rise in alveolar CO_2 pressure is noticed soon after breakfast, followed by a second fall an hour later. The night urine was acid, while that excreted during the first hour after rising (fifteen minutes after breakfast) was somewhat alkaline. One hour later, the reaction of the urine had swung back to the acid side again but became decidedly alkaline later in the morning. The results obtained in this experiment tend to corroborate the findings of Dodds except that the acid tide was of short duration.

TABLE II

Relation of reaction of Urine to Alveolar CO_2—fasting.

Time	*Volume of Urine (cc. per hour)*	*Reaction of Urine (Alkalinity per cent.)*	*Alveolar CO_2 (mm. of Hg pressure)*
6.00 a.m.	—	—	46.9
11.00 p.m. to 8.00 a.m.	16.0	30.3	39.8
8.00 a.m. to 9.00 a.m.	15.0	45.5	40.4
9.00 a.m. to 10.00 a.m.	18.0	59.5	40.4
10.00 a.m. to 11.00 a.m.	21.0	92.0	40.7
11.00 a.m. to 12 m.	19.0	81.8	41.2

Expt. 16. 11–3–23. No breakfast. First specimen of alveolar air obtained at 6.00 a.m. in bed before rising. 100 c.c. of water at 9.50 and 10.30.

When no breakfast was taken, the alveolar CO_2 pressure, after its preliminary fall, remained practically constant throughout the morning (Table II.). The urine excreted during the night was acid, as usual, and showed a marked shift towards the alkaline side at the end of the first hour after rising, continuing to

become more alkaline as the morning advanced. It will be noted that the hourly volume of urine was small in this case, showing that the alkaline tide was not dependent upon a diuresis. I have not been able to substantiate the statement of Dodds[2] that the morning alkaline tide is abolished by fasting.

Relation of Reaction of Urine to Gastric Secretion.—It has been suggested that even during fasting the stomach secretes a certain amount of gastric juice as a result of "habit" or of "appetite", which may still be responsible for the alkaline tide. The results of the experiment recorded in Table II. do not give any evidence of such being the case, in so far as the secretory activity of the stomach may be detected by variations in the alveolar CO_2.

An attempt was made to secure some more direct evidence of association, if any, between gastric and urinary changes by the examination of the contents of the stomach obtained by means of the Rehfuss tube coincidentally with the collection of urinary specimens. Table III. shows the results of such an experiment, in the case of a normal, healthy individual. The alkalinity per cent had gone up from forty-four to sixty during the first hour after rising, while the gastric fluid at that time showed only a trace of HCl. Since water is said to act as a gastric stimulant[11], the matutinal alkaline tide in this instance, might be associated with the stimulating power of the water. In order to determine this association, an attempt was made to inhibit the gastric secretion with atropine in the same subject on another day prior to drinking a similar quantity of water (Table IV.). Under this inhibition, the alkaline tide had, undoubtedly, begun before there was any evidence of acid secretion by the stomach.

TABLE III

Relation of reaction of Urine to Gastric Secretion.

Time	Volume of Urine (cc. per hour)	Reaction of Urine (Alkalinity per cent.)	Stomach Contents (cc. o. ¼ N. Per cent.) Free HCl. (dimethyl.)	Total Acidity (phenol'n.)
10.00 p.m. to 7.30 a.m..	23.0	44.0	0.0	4.0
7.30 a.m. to 8.30 a.m..	32.0	60.3	2.0	12.0
8.30 a.m. to 9.30 a.m..	166.0	75.9	22.0	24.0
9.30 a.m. to 10.30 a.m..	350.0	77.0	25.0	29.0
10.30 a.m. to 11.30 a.m..	63.0	90.8	27.0	31.5
11.30 a.m. to 12.30 p.m..	35.0	89.7	40.0	43.5

Expt. 4. 4–25–23. Stomach tube swallowed at 7.30 a.m. 500 cc. of water drunk at 8.30.

TABLE IV

Reaction of Urine with Gastric Inhibition.

Time	Volume of Urine (cc. per hour)	Reaction of Urine (Alkalinity per cent.)	Stomach Contents (cc. o. ¼ N. Per cent.) Free HCl. (dimethyl.)	Total Acidity (Phenol'n.)
10.30 p.m. to 7.30 a.m..	27.0	33.6	—	—
7.30 a.m. to 8.30 a.m..	60.0	49.0	0.0	6.0
8.30 a.m. to 9.30 a.m..	38.0	85.3	0.0	0.0
9.30 a.m. to 10.30 a.m..	204.0	86.2	14.0	20.0
10.30 a.m. to 11.30 a.m..	218.0	86.6	8.0	15.0
11.30 a.m. to 12.30 p.m..	94.0	87.7	32.0	40.0

Expt. 5. 4–29–23. Stomach tube swallowed at 8.30 a.m. and stomach washed out with atropine sulphate gr. 1/100 dissolved in 100 cc. of water. 500 cc. water drunk at 9.30.

Reaction of the Urine in Achlorhydria.—On several occasions, the presence or absence of the matutinal alkaline tide was looked for in patients who were having their gastric function investigated by means of the "fractional" method. Three patients, whose stomach contents showed an absence of HCl throughout, exhibited a normal alkaline tide (Table V.) In several patients, who gave a normal curve of gastric acidity, the tide had begun before the stomach had started to secrete (Table VI.).

TABLE V

Reaction of Urine with Achlorhydria.

Time	Volume of Urine (cc. per hour)	Reaction of Urine (Alkalinity per cent.)
10.00 p.m. to 5.00 a.m...	120.0	34.3
5.00 a.m. to 6.00 a.m...	200.0	55.0
6.00 a.m. to 8.00 a.m...	47.0	79.0
8.00 a.m. to 10.00 a.m...	64.0	85.7
10.00 a.m. to 11.00 a.m...	23.0	58.2
11.00 a.m. to 12.00 m....	21.0	58.5

Time (a.m.)	Stomach Contents (cc. o. ¼ N. Per cent.) Free HCl. (dimethyl.)	Total Acidity (phenol'n.)
Pre-Meal.....	0	15.0
9.00.....	0	8.5
9.15.....	0	10.0
9.30.....	0	10.0
9.45.....	0	5.0
10.00.....	0	12.5
10.15.....	0	16.0
10.30.....	0	10.5
10.45.....	0	10.0
11.00.....	0	10.5

Expt. 34, 7–22–24. Test meal of gruel given at 8.45 a.m.

Reversed Routine.—In order to investigate further the relationship of the alkaline tide to respiratory activity, some observations were

TABLE VI

Reaction of Urine with Test Meal.

Time	Volume of Urine (cc. per hour)	Reaction of Urine (Alkalinity per cent.)
10.00 p.m. to 5.00 a.m...	79.0	27.8
5.00 a.m. to 6.00 a.m...	?	36.3
6.00 a.m. to 7.00 a.m...	25.0	61.7
7.00 a.m. to 8.00 a.m...	6.5	80.8
8.00 a.m. to 9.00 a.m...	17.0	57.7
9.00 a.m. to 10.00 a.m...	78.0	59.5
10.00 a.m. to 11.00 a.m...	27.0	43.0

Time (a.m.)	Stomach Contents (cc. o. ¼ N. per cent.) Free HCl. (dimethyl.)	Total Acidity (phenol'n.)
8.15	0.0	11.0
8.30	10.5	29.0
8.45	17.5	35.0
9.00	15.0	34.0
9.15	21.0	37.0
9.30	24.0	40.0
9.45	27.5	44.0
10.00	33.2	47.3
10.15	22.5	39.0

Expt. 21, 12–10–23. Test meal of gruel given at 8.00 a.m. No resting juice.

made under conditions of "reversed routine", that is, the subject slept during the day and worked during the night. It was thought that an alkaline tide might appear on arising in the late afternoon but such was not the case, on two occasions. Perhaps it is that the organism does not readily adapt itself to changes in routine; on the other hand, sleep may not be so sound in the day time as it is at night. It would be interesting to apply the test to one who had accustomed himself to this reversal of conditions.

Summary and Conclusions

The observations here recorded justify the following conclusions:

(1) The alveolar CO_2 pressure is high immediately on waking in the morning and falls subsequently as has been shown by Leathes.

(2) The alveolar CO_2 pressure first rises and then falls as the result of taking food, as demonstrated by Dodds.

(3) Although the occurrence of slight variations in the reaction of the urine, as the result of the first meal of the day, has not been disproved, the larger, essentially "morning" alkaline tide appears to be more closely related to respiratory phenomena than to digestive phenomena.

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Fibrous Ankylosis of the Hand Due to Prolonged Swelling.—A. Bruce Gill, Philadelphia, asserts that fibrous ankylosis of the fingers which is due to prolonged swelling is one of the most common acquired disabilities of the hand. It may result from any fracture or dislocation in the upper extremity, and from extensive wounds and infections of the hand or forearm. It presents the chief disability which results from Colles' fracture. In any surgical lesion of the upper extremity, the condition of the hand must never be lost sight of. All things that tend to produce swelling must be eliminated so far as possible, and the swelling must be actively combated from the very beginning. The deformity and disability is difficult of correction, and frequently disables the wage earner for long periods of time or even permanently. Owing to the frequency and the disabling nature of this lesion, the importance of its prevention cannot be exaggerated. It is probably the one most important surgical condition of the hand.—*Jour. Am. Med. Ass.*, Oct. 18, 1924.

AUTOTRANSFUSION

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THE idea of introducing into the patient's veins the fluid blood poured into the serous cavities as a result of trauma, or ruptured ectopic gestations, was first suggested in 1914 by J. Theis[1] a German. Quite an extensive literature has developed in Germany since the publication of the original article, but very little has appeared in British or American periodicals on the subject.

It has been a common observation in such cases as ruptured ectopics, that there is a large quantity of fluid blood mixed with the dark coloured clots, and that this fluid blood, probably due to its admixture with peritoneal exudate, does not clot readily. The idea of Theis is, to filter this blood of its clots and re-introduce it into the veins of the patient during the course of the operation. He did this in his first few operations by mixing the effused blood with sodium citrate in the ordinary way; later, by mixing it with saline solution, and finally used the whole blood without any vehicle. He concluded that it made no material difference which method was used. Under modern conditions nearly all large hospitals have a staff of properly tested blood donors who are at once available for transfusion purposes in cases requiring such treatment. Many cases of ruptured ectopic or other severe haemorrhage require blood transfusion during the course of operation. This invariably means a considerable delay while a donor with a suitable blood grouping is found, and also considerable expense. The patient already has a large amount of her own blood available in her abdomen; there can be no question of unsuitable blood grouping; there need be no delay and no expense, and it always has seemed a mistake to waste such valuable fluid in a patient who requires it so urgently.

The writer has used the method of autotransfusion in nine cases of ruptured ectopic pregnancy, employing a very simple technique. An assistant, usually a house surgeon, opens a vein in the arm and inserts a canula while the abdomen is being opened. He then commences a flow of normal saline solution. When the abdomen has been opened the fluid blood is sucked out, or ladled out with an ordinary cup or dipper. This blood is then filtered through about eight thicknesses of gauze moistened with physiological salt solution and allowed to run into a beaker containing about 200 cc. of salt solution. When all the blood has been collected it is poured into the jar from which the saline is already running into the vein through the canula. The house surgeon looks after that part of it, and the operation proceeds. As a rule, by the time the abdomen has been closed the assistant has closed, or is closing the vein.

Of the nine cases upon whom the writer has used this method all recovered. Just how much credit should be apportioned to the transfusion, I do not know. The amount of fluid re-introduced varied from 160 cc. in case four, to 420 cc. in case eight (see Table). In addition there was about 200 cc. of normal saline used as a vehicle. There is nothing particularly striking in any of the histories of these cases, they were all straightforward cases of ruptured ectopic of average severity, consequently detailed histories are not included; a small table being substituted.

Although autotransfusion will undoubtedly find its greatest field of usefulness in ruptured ectopic pregnancies, there is no reason why it should not be equally applicable in many other conditions with extensive haemorrhage into serous cavities, such as in cases of ruptured spleen, liver, uterus, or lung. Burch[2] reports a case in which he used the method for severe haemorrhage during the course of splenectomy for splenic anaemia, and quotes many cases from the German literature describing its use in a variety of ruptured viscera. Schaefer quoted by Burch[2] has made a very interesting sugges-

tion for using extravasated blood, which may possibly have become contaminated, as blood is liable to do which has remained within the abdomen for any considerable time. He collects the blood and uses it as a rectal drip, substituting it for the saline-glucose-brandy mixture so commonly used. I have not tried this method.

It would seem that autotransfusion is comparatively safe and possesses obvious advantages. Up to the present I have not heard of a fatality, nor have I observed any reaction following the introduction of the blood. Now that case reports are beginning to appear in English and American periodicals we may expect further information on this subject, and the safety of the procedure will be better appreciated.

TABLE

Case	*Age*	*Para*	*Duration Perforated*	*Amount Infused*	*Anaesthetic*
1	22	1	4 hours	210 cc.	Gas. Oxy.
2	24	1	7 "	315 cc.	" "
3	31	3	9 "	380 cc.	" "
4	19	1	2 "	160 cc.	" "
5	36	4	2 "	210 cc.	" "
6	29	3	4 "	280 cc.	" "
7	33	3	6 "	400 cc.	" "
8	36	1	6 "	420 cc.	" "
9	20	2	3 "	240 cc.	" "

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A CASE OF HYPERNEPHROMA ASSOCIATED WITH THYROID HYPERACTIVITY

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FOR the last quarter of a century perhaps no branch of medical advancement has been so meteoric as that of endocrinology. That the glands of internal secretion are very intimately associated the one with the other we are quite certain, but to what point the one depends on the other has been a matter of much conjecture, theorizing and experimentation. The following case studied by us at the Royal Victoria Hospital, presents a clinical picture, which in several features bears out the experimental observations which lead us to believe there exists a definite, intimate, and perhaps absolute, interrelationship between the suprarenals and the thyroid. Before presenting the case it would, perhaps, be well to make a cursory review of the work directly applicable to the subject, which has been done up to the present time.

Brown Sequard, in 1851, showed that animals which survive a double suprarenalectomy for a week or more lose weight rapidly. This loss of weight was due to a rapid disappearance of fat. Porges and many others have shown that adrenalectomy causes a rapid disappearance of glycogen from the liver, and a progressive fall of blood sugar in dogs and rats. Their relation to alterations in the rate of metabolism did not, however, attract much attention.

Golyakowski, 1899, noted that in ligation of the suprarenal artery in dogs, in those which survived over six weeks, there was a rise in heat production and CO_2 output of 30%, in the first ten days, followed by a drop nearly to normal, then a second rise as high as 50% between the second and fourth weeks, falling to, or even below, normal on the sixth or seventh week. Heat production and heat loss were parallel, from which he concluded the heat regulating mechanism was intact. No experimental data was furnished.

Aub found a slight rise in metabolic rate for some hours after operation, and eighteen hours after, a fall 25% below normal. Marine and Baumann, 1921, showed that removing or crippling the suprarenal glands in rabbits, caused an increased heat production and CO_2 output. This disturbance was definitely related to the completeness of removal of the cortical function.

The symptom complex resulting from des-

truction of suprarenal function in rabbits resembles exophthalmic goitre in many features.

Boothby and Sandiford, 1923, showed that when adrenalin was injected intravenously into dogs in doses which seem within the power of the adrenals to secrete, it increased the rate of heat production,—probably by a general and quite parallel increase in heat production of all or nearly all types of cells. The increased metabolism is accompanied by an elevation of the respiratory quotient and by a slight increase in blood sugar concentration. Barcroft and Dixon, 1906, demonstrated that after addition of adrenalin to the blood, the oxygen consumption was increased two or three times, while CO_2 elimination lagged.

Boothby and Sandiford, in 1919, produced data which showed there is no relation between the character of adrenalin reaction and the degree of thyroid activity, and thus disprove the opinion of Goetsch, that the reaction is indicative of the presence or absence of hyperthyroidism. In one patient with diabetes and hyperthyroidism they found marked rise in heat production following the administration of adrenalin.

Marine and Baumann, 1922, in a series of experiments on rabbits, showed that thyroidectomy caused a decrease in metabolism, and subsequent complete adrenalectomy, a further decrease. They stress the fact that, as in previous experiments on rabbits with intact thyroids, the metabolism did not show a primary increase. They therefore conclude that the difference in reaction indicates a thyroid adrenal inter-relationship which may have a bearing on the etiology of exophthalmic goitre. They again reported a series of experiments which demonstrate a decrease in heat production in rabbits after thyroidectomy, followed by a further decrease after adrenalectomy. They emphasize their previous evidence that the primary increase in heat production after adrenalectomy does not occur if the thyroid has been removed. They present further evidence to support their previous observation that partial destruction of the suprarenal cortex in rabbits with intact thyroids causes a prolonged rise in heat production. The period may last from a few days to several months.

Aub, Bright and Forman report twenty-four experiments on the effect of adrenalectomy on the basal metabolism of urethanized cats. These experiments show a prompt fall of the metabolism after the removal of the adrenals. The decrease is as large as 25%. Urethane emphasized the symptoms of adrenal insufficiency.

It has been shown by Golyakowski on dogs, by Marine and Baumann on rabbits, and by Scott on cats, that severe crippling of the suprarenals, with intact iodin-containing thyroids, usually leads to a prolonged increase in heat production. This usually begins in six days and lasts from a week to several months, falling gradually to, or below, the normal level. These findings, Marine and Baumann believed showed that the thyroid gland by reason of its iodin-containing hormone, was necessary for the reaction of increased heat production following suprarenal injury. These experiments suggested another thyroid-adrenal inter-relationship in addition to the chromaphil tissue thyroid inter-relationship. The chromaphil relationship since Ascher's work is believed to be due in part to a direct stimulating effect of adrenin on the thyroid gland through the sympathetic nervous system. The nature of the former action is still unknown. Baumann and Marine suggested that the suprarenal cortex normally exercised a regulatory or inhibitory control over thyroid activity, and when this control was inhibited the thyroid automatically responded with increased activity resulting in increased heat production if sufficient thyroxin were discharged during this increased activity.

By nine experiments they further showed that thyroidectomy abolishes or greatly lessens heat production which normally follows injury of the suprarenal function in rabbits. They show that single doses of iodin administered by mouth increase the heat production in suprarenalectomized rabbits, with incomplete thyroidectomies. There is also evidence that sublethal crippling of the suprarenals causes a rapid loss of iodin from the thyroid.

These abstracts tend to show that there is a relationship existing between thyroid and adrenals, and bearing these in mind the case which we are presenting may be better appreciated.

The patient was in the hospital on four separate occasions within a period of six months:

the following excerpts from the records show the progress of the disease.

First Admission.—No. 38020, April 18, 1923; Mrs. M. G., aged sixty-eight. Walked in.

Complaints.—Pain in back, weakness.

Family History.—Negative.

Personal History.—Menopause fifty-two. Slight haematuria lasting three days, March, 1923. None since.

Present illness.—Pain in back of dull aching character, started eight months ago; has been more or less persistent since. Complains of progressive weakness. Pain in back does not radiate.

Physical Findings by Systems

Glandular System.—Thyroid slightly enlarged, adenoma size of walnut in left lobe. Has been like this twenty-two years with no change. Other glands not enlarged.

Cardio-vascular System.—Pulse regular 90-100. B.P. 135-80. No cardiac hypertrophy. No oedema. No signs of endocarditis.

Respiratory System.—Negative.

Digestive System.—Teeth in good condition. Throat clear. Abdomen flabby and soft, no masses felt, no areas of tenderness.

Genito-Urinary System.—History of haematuria. Pelvis negative. Urine negative.

Nervous System.—Eyes normal. No tremor. No pathological reflexes.

Joints normal.

Special Examinations.—X-ray of spine—normal.

Patient was given hydro-therapeutics and discharged feeling better, May 8th.

Diagnosis.—Rheumatoid arthritis.

Second Admission.—June 27, 1923. Urological 3975.

Complaints.—Haematuria—supra-pubic pain.

History.—Fairly well since discharge May 8th. June 23rd had a severe attack of haematuria associated with supra-pubic pain. Since then has had palpitation and throbbing in head and neck.

Findings.—Thyroid slightly enlarged, no pulsations, no thrill, no eye signs, no tremor .

Cardio-Vascular.—Pulse 100-110, full volume, high tension. B.P. 180-80. No cardiac enlargement; no murmurs.

Physical Findings.—Still negative.

Special Examinations.—Blood Wassermann—negative. Cystoscopic. Bladder normal. Urine from both ureters contained many red cells, few white cells, no casts. Culture of urine showed no growth. Kidney function tests P.S.P. 62% and 69%. Basal metabolism not done.

Patient discharged, July 6th, with diagnosis of hypertension with haematuria.

Third Admission.—August 20. 38727. Complaining of weakness, haematuria, nervousness, palpitation and anorexia. Condition has been getting progressively worse. Lost twenty-three pounds since April. Shows emaciation. No oedema.

Glandular System.—Thyroid same, no eye signs; marked tremor. Tachycardia 120-130.

Cardio-Vascular.—No oedema. Rapid pulse, of Corrigan type. Capillary pulse. B.P. 190-90. Some cardiac enlargement. Sounds soft and flabby. Systolic murmur at apex, diastolic at base. Urine acid 1020, trace alb. red and white blood cells, granular and hyaline casts.

Respiratory System.—Normal.

Digestive System.—An indefinite mass is palpable in left lumbar region. It is moveable and tender. Right kidney not palpable.

Genito-Urinary.—Pelvis negative.

Nervous System.—Definite tremor.

Special Examinations.—X-ray shows large left kidney. Basal metabolism is very high + 50.3%. Blood chemistry normal. X-ray of chest showed no extension downwards of thyroid. The patient was discharged August 25th to return later for operation if she did not improve. Put on iodin therapy.

Fourth Admission.—Sept. 10th. Urology 4109.

Since discharge she has been much worse. Haematuria and supra-pubic pain are persistent. She is very nervous, excitable, and weak. Thyroid has not increased in size. Marked tremor, no eye signs.

Cardio-Vascular System.—Same as on previous admission; slight oedema of dependent parts. Mass in left groin increasing in size. Right kidney now palpable. Urine from both ureters shows red and white blood cells.

A left nephrectomy was performed. The upper pole of the kidney was involved by a tumour mass extending up to the diaphragm. This was removed. The patient seemed to rally a little after the operation, but sank again, and on request was discharged unimproved and weaker on October 6th. She was attended by Dr. Kaufmann at home where she died two months later.

The features of the case in the last two months of the illness were those of a typical case of toxic goitre, with finally a tendency towards exophthalmos, associated with its usual cardio-vascular embarrassment, indicative of a failing musculature. This was evidenced by oedema, congestion of the lungs, slight engorgement of the liver, and increased area of cardiac dullness, with which were associated defective aortic and mitral valves. The mass in the right upper quadrant increased in size, and could be definitely associated with the kidney.

Digitalis and iodin were uneffective.

No necropsy was procured.

Pathological findings in removed kidney.—"Specimen consists of kidney, lower half of which appears to be practically intact. The upper half is replaced by an irregular lobulated mass, about twice the size of the kidney. The cut surface of this is yellowish with small red areas. Microscopical examination shows clusters of about a dozen pale reticular large cells most of which show small nuclei. The clusters are separated by very thin bands of fibrous connective tissue. Three sections differ only in amount of blood clot shown. Two contain very considerable fibrin and red blood cells, amongst the groups of large pale cells. Anatomical summary—hypernephroma."

Summary

We have here a patient who on four admissions directed attention to haematuria, which lasted from the time of onset to death, a period of six and a half months. There was a marked hypertension, beginning slowly and rising

rapidly, and persisting right through to the end. The basal metabolism was markedly increased in last two months which, with anxiety, nervousness, tachycardia and tremor, gave a typical clinical picture of toxic goitre.

She did not respond to iodine or digitalis therapy. Following the nephrectomy the patient's condition was one of rapidly progressive aggravation of symptoms of thyroid toxicity, and of cardiac embarrassment with resulting decompensation and death.

A mass on the right side rapidly increasing in the latter weeks of the disease we considered a similar involvement of other kidney associated, perhaps, with a secondary nodule in the liver.

Conclusion

1. As the hypernephroma extended the thyroid—already unbalanced by an adenoma—became suddenly toxic.

2. Death occurred from thyroid hyperactivity and hypernephroma, the toxicity of the one progressing proportionally to the destruction of the other.

With much being done to establish a suprarenal thyroid inter-relationship, we thought it would be interesting to present the above case which gives us either a very striking illustration of such a phenomenon, or an extraordinary clinical coincidence.

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The Undertaker and Postmorten Examinations.—At the annual session of the Medical Society of the State of Pennsylvania, in 1923, a committee was appointed to ascertain: (1) why the undertakers object to permission being given for necropsy, and (2) what might be done to secure the co-operation of the undertakers in increasing the number of postmortem examinations of persons dying from disease. The committee, which consulted with committees from the morticians' association, has rendered a report, which is being sent to all the institutions in Pennsylvania. Obviously, the chief objections of the undertakers to routine postmortem examinations are that preference may be given to certain undertakers by some institutions, and that mutilation of the bodies by the postmortem examination makes more difficult the task of the embalmer. Therefore, the Pennsylvania committee has outlined a number of points that should be observed by the pathologist. These small details are important so far as relates to the appearance of the body after it is embalmed and to the course of embalming. They concern proper modes of dissection and opening of the skull. The committee has also outlined a number of conclusions and recommendations, which merit attention by all who are interested in extending medical science through increase in the number of postmortem examinations. The medical profession should co-operate more closely with the mortician in proper care of the body after death. Through raising the standards of the undertaking profession, men will be developed who are anxious to co-operate with the physician in making proper postmortem examinations. It is hoped that the intern will be instructed in methods of securing consent to postmortem examinations and that the public will be educated as to the value of the procedure. Meetings should be arranged in each institution between members of the staff, the clergy of the community and the undertakers at which the matter may be fully discussed and co-operation invited. Undertakers may also be informed that preference will continue to be given by medical institutions to those who are willing to aid scientific work by proper co-operation in the matter of postmortem examinations. The report of the committee of the state society of Pennsylvania is an interesting document, and worthy of the attention of every medical group concerned with this problem.—*Jour. Am. Med. Ass.*, Nov. 8, 1924.

PYELITIS IN INFANCY AND CHILDHOOD

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Fort William

IN this article the term pyelitis is used to denote a pathological condition of the urinary organs of which the main indication is the passage of strongly acid urine containing pus cells and a small amount of albumin. Although sometimes associated with the extension of infection to other portions of the urinary system, and then denominated cystitis, pyelonephritis and pyelocystitis, it is deemed wise in this article to consider only the acute febrile disorder affecting chiefly the pelvis of the kidney, regarding it as a separate entity.

The disease develops much oftener in infancy and childhood than was formerly supposed, and is in fact of decidedly frequent occurrence. The fact that this condition has failed to obtain the attention due to its importance may be largely attributed to the difficulties in obtaining urinary specimens from a small infant or child from which to make the diagnosis.

In agreement with the reports of other observers the experience gained from the following would indicate that the disorder is of rare occurrence in the first six months of life, but is met with at least twice as frequently before the age of two years as it is after that age. In the writer's collection of patients more than two-thirds of his cases occurred between the ages of six and twenty-four months; nineteen of the patients were female and five male. The following is a detailed statement:

	Female	*Male*
Patients under 6 months	0	0
" from 6 - 12 months	12	3
" " 12 - 24 "	7	2
Patients over 2 years	5	

Etiology.—An etiological survey of the twenty-four patients under review indicates the great variety of depressing infections which may be followed by pyelitis. Among the more frequent are the following: acute nasopharyngitis, especially when of the influenzal type; infections of the pharyngeal tonsil; chronic infections of the respiratory tract, especially chronic bronchitis; disorders of the gastrointestinal tract, especially fermentative and infectious diarrhoea. Holt[1] states that pyelitis may result as the sequel of diphtheria or one of the various infectious diseases. It frequently follows acute disturbances of the gastro-intestinal tract, and he adds that of all the pathogenic organisms that have been found in the urine in cases of pyelitis, the one present with the greatest frequency is the colon bacillus and that usually alone. In Kretchner's[2] series of eleven cases, ten had a colon bacillus infection. In a few cases mechanical irritations are an apparent cause, but in quite a number, in my series sixteen out of the twenty-four, careful investigation failed to reveal even a remote cause. As the majority of those in whom the infection occurs are female infants it would appear that the infection may be due to defective care of the buttocks and vulva, a delayed changing of diapers, or a careless cleansing of the buttocks towards the vulva. In the case of male infants all the instances in the author's series occurred in uncircumcised patients and especially in those with a fairly marked degree of phimosis. A routine bacteriological culture of the urine was not carried out on account of the difficulty encountered in private houses in obtaining an absolutely pure specimen. It is however, the belief of the author that the majority were an almost pure colon bacillus infection.

Symptomatology.—Even with the occurrence of an apparently primary idiopathic pyelitis we do not always meet with the characteristic symptoms regarded as typical of the disease. It may be encountered in infants in whom it has apparently existed for some time with no other signs than perhaps loss of appetite, and a temperature of between 99° and 100° F., and it is only upon careful examination of the urine that the diagnosis can be made. In some cases a convulsion, high fever and collapse may usher

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in an attack with dramatic suddenness. In older children repeated chills and wide variations in a four hourly temperature may be noted. In others we meet only with moderate fever and few other constitutional symptoms. In my series a moderately high fever (102-103°) has been the most constant finding noted. A common remark from the attendant is the statement that the patient appears flushed at one moment and quite cool the next. Vomiting is a frequent symptom and may vary from a mere casual regurgitation to a severe persistent form. The cough occasionally referred to in the detail of symptoms sounded more of a gag, or expiratory explosion following upon sour regurgitations or after the belching of gas. Diarrhoea is a common accompaniment, and while sometimes severe, generally improves promptly on careful treatment. Constipation is met with occasionally, but is readily overcome. The peculiar condition known as geographical tongue is seen occasionally, especially in those cases in which a marked inflammation of the throat is present. Loss of weight is apt to occur in cases in which the disease has existed for some time. Other symptoms which may occasionally be discovered are pain in the abdomen and back, and pain in voiding the urine, and in older children as noted by W. B. Hunter[3] chills; cerebral symptoms are rare. A more varied and irregular train of symptoms is hardly to be met with in any other febrile disorder in infancy and childhood. Few cases of pyelitis present the same symptomatology. It is wise therefore always to think of and look for pyelitis in obscure febrile conditions of an early age.

Treatment—Diagnosis.—Dunn[4] includes in his list of therapeutic measures rest in bed, a milk diet, an abundance of alkaline waters by mouth, and the use of some antiseptic such as hexamine and salol. When it is necessary to irrigate the bladder he states that this may be done with a boric acid solution or 1-1000 silver nitrate solution followed by a one per cent solution of sodium chloride. R. H. Perry[5] remarks that the treatment should be conducted along three lines: 1. Making and keeping the urine alkaline with sodium bi-carbonate or potassium citrate, 25-30 grains daily for an infant and 80-120 grains daily for older children. 2. Using some urinary antiseptic as urotropin or salol or guaiacol. 3. Using autogenous vaccines. The balance of evidence however, is against the use of vaccines. He states further that it is best to alternate the alkaline treatment with the urinary antiseptics.

Rawlings and Leigh[6] did not find the latter treatment of much success, laying particular emphasis on the alkaline treatment as being the most efficacious. Porter and Carter[7] have used salol 3 grains, sodium benzoate 5 grains (for a twenty-five pound baby) at three or four hourly intervals for a period of a week or ten days with favourable results, in those cases which did not seem to be benefited by the alkaline treatment or hexamethylenamine. Further they recommend that in those very resistant infections the use of lavage for the pelvis of the kidney is a measure of great value.

L. D. Hoppe[8] in a lengthy article discusses the use of hexamethylenamine and does not regard it with much favour. He has tried pelvic irrigations with good results. Helmholtz[9] also after a critical survey of the literature does not regard hexamethylenamine of any real value. Hinman[10] reports a series of thirty children under nine years of age in whom cystoscopy was performed. Krestchner[11] and his associates treated eleven cases by pelvic lavage with good results and with *no* untoward reactions following instrumentation and treatment. D. M. Cowie[12] has brought forward instructive illustrations of the employment of normal horse serum (foreign protein) treatment of pyelitis. Case 4 in the paper is offered as an example of this suggestion. The author has had opportunity to test this method upon several occasions and in selected instances has found that it gives very favourable results. Particularly, is it of benefit in those patients whose urine after culture shows a mixed infection of *B. coli* and streptococcus.

In the present series of patients the alkaline treatment has been used. Potassium citrate in the form of a saturated solution was given, 60-160 minims in twenty-four hours. The commonest dosage, independent of age, was M.xv or M.xx every three hours, six to eight times in the day. It was found that this was a most convenient way to administer the drug.

This treatment gave prompt and beneficial results in fourteen patients, who were pro-

nounced cured in fourteen days and in five who were cured in between fourteen to nineteen days. Two deaths were recorded, but can hardly reflect on the therapeutic measures used, in that, one patient had been ill three months before receiving a diagnosis, and the other disobeyed orders and temporarily refused further advice. In one instance, Case 3, hexamethylenamine was employed in place of the potassium citrate but gave unfavourable results, a recurrence of fever with other constitutional symptoms resulted. Prompt relief followed when the alkaline treatment was begun again. In the majority of instances, upon the advent of the alkaline administration, the fever rapidly declined and in a few days, other symptoms had vanished. No objectionable features were encountered with the use of such large doses of potassium citrate. In many of the patients a marked thirst appeared which in some measure helped in the management of the disease.

The following four case reports have been selected from the above number of patients as typical of the moderately severe infection and showing the principles of treatment and management carried out by the author. The microscopical examination of the uncentrifuged urine usually made the diagnosis. The presence of an amount of albumin usually in proportion to the amount of pus in a strongly acid urine were the constant findings. The diagnosis of pyuria is justified when more than six to eight pus cells are found in every high power field uncentrifuged. This latter is most important and the urine should not be centrifuged in making a diagnosis. Casts are rarely found and in only one instance were there large numbers of red blood cells. The commonest finding was 100 + or more pus cells in the high power field of uncentrifuged urine. The criterion of cure was taken when the subsidence of symptoms was accompanied by a complete and permanent disappearance of the pus from the urine.

Conclusions

(1) Pyelitis is often a disease of infancy and childhood and its diagnosis is frequently overlooked.

(2) In every case of illness with fever during infancy and early childhood there should be a microscopical examination of the urine.

(3) It is a good plan to suspect pyelitis in any recurring fever of obscure origin.

(4) Widely fluctuating fever with vomiting and diarrhoea and negative physical findings are the commonest symptoms presented.

(5) The value of potassium citrate in the treatment of the disease is here demonstrated.

(6) A fatal termination is unusual, prompt recognition of the trouble and the alkaline treatment afford an efficient means of ensuring a speedy and lasting recovery.

Case Reports:

Case No. 1.—Male, age nine months. Feeding formula, cow's milk and sugar, plus cereals and fruit and accessory food factors. Had fermentative diarrhoea three months before, with complete recovery.

Present illness of twenty-four hours' duration; a cold in the head and diarrhoea. Examination showed a temperature of 104° with some vomiting and frequent short cough. The stools were loose and green, with mucus and curds. There was a leucocytosis of 21,000; the Widal and Wassermann tests were negative. The urine was acid and showed uncentrifuged over 100 pus cells per high power field; albumin + +, no sugar.

The treatment given was 15 minims of saturated solution of potassium citrate, every three hours, throughout the twenty-four hours. Two days later the temperature was 101°, and there was still some vomiting and pyuria. The next day the temperature was normal, and there was less vomiting. A relapse occurred after this, with symptoms of acute intoxication, and a transfusion was given. Four days later the child had practically recovered.

Case No. 2.—Female, eight months old, breast fed. The baby had been ill four weeks with diarrhoea, showing mucus and curds in the stools, slight vomiting, fever and poor appetite. Examination showed fair nutrition, but the infant looked quite pale. There was a double otitis media with double myringotomy. The laboratory examination showed a leucocytosis of 17,000, with polymorphonuclears predominating, and 3,800,000 red blood cells, haemoglobin 65%. The Widal and Wassermann tests were negative. The urine was acid, with albumin + +, and no sugar. An uncentrifuged

specimen showed over 100 pus cells per high power field.

Treatment with potassium citrate was instituted, giving twenty minims of a saturated solution every three hours eight times in the day. In two days there was marked improvement generally; the quantity of pus in the urine was definitely less; a week later there were only twenty pus cells to the high power field in an uncentrifuged specimen. Recovery was complete in two weeks from the beginning of the treatment.

Case No. 3.—Female, one year old, weight twenty pounds; was being fed on a mixture of cow's milk with cereals and some fruit. The illness was of about four weeks' duration; the symptoms were fever, vomiting, a poor appetite, and noticeable loss of weight. Examination showed a temperature of 104°; the throat was inflamed, with a post-nasal exudate; the spleen was just palpable. The general nutrition was fair, but the infant had a pale pasty appearance. The laboratory examination showed a leucocytosis of 20,000, with polymorphonuclears predominating, red blood cells 3,600,000, haemoglobin 60%. The urine was acid, and showed albumin +, no sugar; there were over 100 pus cells to the high power field in an uncentrifuged specimen. The Widal and Wassermann tests were negative.

Treatment with potassium citrate was given in the same dosage as in the last mentioned case. For about a week there was little change in the condition; the dosage was then increased to thirty minims every three hours. Six days later there was marked improvement, the urine only showing twenty-five cells to the high power field, and the temperature was only 100°. This improvement continued, although pus cells were still found in the urine, being as many as forty per field. The treatment was now changed to hexamine, gr.v every four hours throughout the twenty-four hours; a solution of acid sodium phosphate was given at same time. The following day the temperature rose to 104°, and the child became acutely ill, the uncentrifuged urine showing albumin and over 100 pus cells to the field. The treatment was again altered, and the baby was given twenty-five minims of saturated potassium citrate every three hours, eight times in the day. In a week's time there was marked improvement, with complete recovery the following week.

Case No. 4.—Female, age nine months, weight twenty-four pounds, breast fed. She had been ill for a week, with fever, vomiting and poor appetite. The general examination was negative, save for a temperature of 103.2°. The blood showed a leucocytosis of 18,000, polymorphonuclears 72%, lymphocytes 28%. The urine was acid, with albumin +, no sugar, and over 100 pus cells to the high power field, uncentrifuged. Widal and Wassermann tests were negative.

She was given 20 minims of potassium citrate every three hours, eight times in the day. For about a week there was only slight improvement, and the dosage was then increased to 30 minims. A few days later only a slight change could be noted; a culture from the urine showed *B. coli*, *streptococcus* and *staphylococcus aureus*. She was now given five cc. of horse serum. Improvement now became more rapid and recovery was complete in about ten days more.

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A FEW COMMENTS ON GASTRO-INTESTINAL X-RAY REPORTS

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THE usefulness and accuracy of radioscopic and radiographic diagnoses of pathologic conditions of the stomach, duodenum and colon, appear much obfuscated by the fact that so many x-ray workers are too anxious to find abnormal conditions in patients referred to them. Among the many gastro-intestinal examinations done, surely it is reasonable to expect that a large percentage are normal. It should be the duty of the radiologist to report what he sees, not what he surmises or what he deduces from his examinations or clinical history elicited from the patient.

There are certain conditions which can be diagnosed with great accuracy; we know that a filling defect in the stomach means new growth, and over 95% of new growths of the stomach are carcinomatous. The radiologist is justified in reporting carcinoma, although he may be accused of having a microscope on his machine. We know that a deformity of the duodenal cap practically always means ulcer, and that there are well defined signs for making a diagnosis of gastric ulcer, tuberculosis and carcinoma of the colon, ulcerative colitis, gastro-jejunal ulcer, diverticulitis of the colon and gastric syphilis.

On the other hand, keeping in mind the fact that stomachs and colons vary greatly in size, shape and position in perfectly healthy people, when the radiologist begins to report bands and adhesions in patient after patient, is he not in a great majority of cases drawing on his imagination? If we find a duodenal cap without any deformity why not report it normal and let it go at that without qualifying the report by saying it is too far to the right or left, or too high or too low due to adhesions.

Another fine field for the radiologist to play around in, is the right quadrant of the abdomen. Some writers say that if the appendix does not fill there is occlusion of the lumen, therefore chronic inflammation; others say if it fills and is segmented there is trouble there, but practically all stress the point regarding tenderness over the appendix. Here the radiologist can be of assistance by locating accurately the point of tenderness and differentiating it from that arising from other organs. He is then giving a combined clinical and radiological opinion. It seems to be a case of playing both ends against the middle, and the patient who is put on the surgical table on the strength of an x-ray diagnosis of chronic appendix is somewhat out of luck.

As was said before, there are wide variations in size, shape and position of the stomach and colon, therefore dilatation of the caecum, ptosis, etc., are relative terms and it is difficult to say what is abnormal. When we have so many conditions that we can diagnose with considerable accuracy, why wander into the realm of adhesions, bands, incompetent ileo-caecal valves and ptoses. Give the internist and surgeon a chance to use their diagnostic acumen also.

Intradermal Salt Solution Test in Scarlet Fever and Diphtheria Patients.—From the study of seventy patients with scarlet fever and thirty patients with diphtheria, two thirds of whom were children, William J. Baker, Chicago, concludes that in these diseases the disappearance time of intradermally injected salt solution is reduced in proportion to the severity of the intoxication. The test aids in prognosis and serves as a guide to the management of a case.—*Jour. Am. Med. Ass.*, Nov. 15, 1924.

TRYPARSAMIDE THERAPY IN NEUROSYPHILIS

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The Drug Itself

Definition and Description.—Tryparsamide, which is the sodium salt of N-phenyl - glycineamid - p - arsonic acid. C_6H_4 ($NHCH_2$ $CONH_2$). (AsO. OH. ONA) was synthesized in 1915 by Jacobs and Heidelberger. It is a white crystalline powder, quite soluble in water, odourless and tasteless and producing a slight irritation when injected into the subcutaneous tissues. The solution is colourless and clear. Its solubility may be judged when it is stated that 1 gram of the drug will dissolve in 1 cc. of distilled water. The drug contains 25.32% of arsenic and as the name indicates has considerable trypanocidal action. It tends to decompose in the presence of acid fumes with the formation of a more toxic and less potent compound. In animals it does not seem to be highly toxic, as a 50% solution can be injected intravenously in an anesthetized animal without any observable effects on the blood pressure or respiration.

Its Actions.—According to Brown and Pearce[1] the main effects of tryparsamide are: First, a stimulation of the vital processes, second, a high degree of penetrability and third, a fair degree of treponemacidal action. These authors state that the results obtained with tryparsamide are due to a "reinforcement of the natural processes of resistance, supplemented by a small but definite measure of treponemacidal action." It does not seem to have a cumulative toxic effect and for that reason can apparently be administered for long periods without harm to the individual. Summarizing the characteristics of tryparsamide, Brown and Pearce state that they are as follows:

1.—Comparative freedom from untoward effects.

2.—A moderate degree of treponemacidal action.

3.—An unusually high penetrability.

4.—A remarkable power of reinforcing the processes of natural resistance and of promoting recuperation.

Ill Effects.—Apparently the main ill effect noticed so far is an occasional tendency for the drug to produce optic symptoms in the form of amblyopia. This results in a dimness or blurring of vision which as a rule is only temporary in nature and disappears when the drug is stopped. It generally appears twenty-four to seventy-two hours after the administration of the drug. These disturbances of vision occur in about 10% of cases treated.

Certain provocative reactions have also been noticed in patients suffering from general paresis and tabes. These, in general paretics, consist in the tendency towards the occurrence of seizures shortly after the administration of the drug and in the case of tabetics in an increase of the pains. These reactions appear to be more frequent following small doses of the drug than with moderate doses.

Dosage, Preparation and Administration.—Apparently the proper dosage for the average individual is to 3 grams of the drug. This amount dissolved in 10-20 cc. of sterile distilled water is given weekly. It may be given subcutaneously, intramuscularly or intravenously. The intravenous route is the preferable one to use. As with other arsenicals it should be given slowly by the syringe method.

Contra-Indications.—The main contra-indication to the use of the drug is the presence of an optic neuritis or neuroretinitis or a primary or secondary optic atrophy. Upon this point, however, Lillie[2] of the Mayo clinic disagrees, claiming that tryparsamide is not more harmful to the eyes than arsphenamine. He further claims that both arsenicals tend to improve already existing optic lesions which in his opinion are entirely due to the infection. Another contra-indication according to Brown and Pearce is the existence of active lesions of syphilis in parts of the body other than the central nervous system.

Conditions In Which the Drug Has Been Employed So Far

The first condition in which this drug was used experimentally was in trypanosomiasis first of animals and later in the human disease. Pearce made use of it in human trypanosomiasis in seventy-seven cases and found it of considerable value. It was then decided to try the use of the drug in neurosyphilis. This was because of the peculiar features associated with that disease. The high penetrability of tryparsamide and its power of stimulating the vital processes, and of increasing the natural immunity of the individual seemed to make it a drug which would be of considerable value in neurosyphilis, a condition in which the spirochetes seemed to be so inaccessible to the therapeutic action of any drug so far tried. Probably the most logical conception of the *raison d'être* of neurosyphilis is that it is due to defective resistance on the part of the nervous system to the action of the spirochaetes. It was therefore thought that probably tryparsamide would increase this resistance.

Reports of Various Clinicians Who Have Used Tryparsamide

The first report of the results of tryparsamide treatment in neurosyphilis appeared from the clinic of Lorenz[3] and his collaborators at Madison, Wis. This report was extremely optimistic. Their method of treatment consisted in weekly doses of tryparsamide and mercury for eight or nine treatments. This was followed by a rest period of five to eight weeks when a second course was given. After another rest, further courses were given if necessary. The results reported were as follows: Of forty-two advanced paretic patients treated twenty-one had been discharged and were working. Of twelve early cases of paresis seven had fully recovered and were earning their livelihood. The remaining five were fit to go home but were being still treated on account of their serology. Of the total of fifty-four cases of paresis twenty-eight patients had been discharged and were earning their living for periods ranging from six months to two years.

Still better results were reported in ten cases of meningo-vascular syphilis treated, all of whom became practically well. Of the total number of cases treated (seventy-eight) the cerebro-spinal fluid became negative in thirty-two cases. In fifty-four cases the cell count was reduced to normal; forty cases showed normal globulin, and the colloidal gold test was favourably affected in sixty-eight cases. In eighteen cases the colloidal gold became absolutely negative. A large percentage of their cases increased in weight during treatment. The authors concluded that tryparsamide was the best drug yet brought forth for the treatment of general paresis.

Moore, Robinson and Keidel[4] reported their results as follows: The drug was of little value in early or late syphilis. They also advised against its use in early neurosyphilis, claiming that arsphenamine and mercury were better. They reported especially upon three cases of early neurosyphilis and thirty-seven cases of what they called late neurosyphilis. However, all these patients were ambulatory and free from severe psychotic symptoms. Thirty-two had had prolonged anti-syphilitic treatment before and tryparsamide was used as a last resort. Their results were somewhat similar to those of Lorenz. In six from the parenchymatous group of twenty-seven and eight from the meningo-vascular group of ten, all phases of the spinal fluid were made negative. Of the thirty-two previously treated cases twenty-two were arrested and three improved. Of the eight previously untreated cases five were arrested and two improved. Six patients remained well as long as three years. The blood Wassermann test was reduced or reversed in 26.6% of cases as compared with 98.7% of cases in the Wisconsin series. In twenty-nine out of fifty patients there was an average gain in weight of 5 kg. Of one hundred and fifty patients treated altogether fourteen had visual symptoms and four had a permanent injury. They recommended that a prerequisite to the use of tryparsamide was a complete ophthalmological examination of the eyes as to fundi, visual fields and visual acuity. The authors concluded that so far as neurosyphilis was concerned tryparsamide was more active than any of the arsphenamines.

Ebaugh and Dickson[5] reported as follows: Of eleven advanced cases of general paresis none were improved. Of thirty-six fairly early

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cases of general paresis ten were improved. Of five cases of meningo-vascular syphilis five were improved. This is a total of fifteen cases improved in fifty-two or practically 30%. Improvement in these cases meant that the patient was at home supporting himself or family. They stated that their serological results were very slight. The cell count and globulin became normal, the gold curve improved, but the Wassermann test remained practically the same in every case. The blood Wassermann test was changed in only one case. In two-thirds of their cases there was a gain in weight. They had severe jaundice in two cases, some visual disturbances and two neuro-relapses. An interesting observation they made was that routine ophthalmological examinations ruled out about one-third of all patients. Their opinion was that tryparsamide was probably the best drug yet used in treatment of general paresis.

Moore, Robinson and Lyman[6] reported as follows: They have abandoned the use of tryparsamide in any condition except neurosyphilis. Their method of treatment consisted in weekly doses of tryparsamide for eight to sixteen injections followed by a course of mercury, arsphenamine or bismuth. They reported upon seventy-eight cases of neurosyphilis including general paresis, tabes and meningo-vascular syphilis. Of thirty-six patients with general paresis complete remission of all mental symptoms occurred in nine (25%) and ten were improved. Fourteen cases with early general paresis had all returned to work. Nine cases out of eighteen of tabes were improved. Of twenty-four patients with meningo-vascular syphilis twenty were relieved of all symptoms. They stated that advanced general paresis was not influenced by the drug but thought that in early general paresis, in tabes and in meningo-vascular syphilis, tryparsamide was superior to any other drug used so far. In parenchymatous neurosyphilis the cerebro-spinal fluid became normal in 22%, improved in 45% and uninfluenced in 32%. In the meningo-vascular group the cerebro-spinal fluid became normal in 69%, improved in 34% and unimproved in 5%. Of a total of 133 patients treated by these clinicians twenty have shown complete clinical arrest with negative serology for one year. Of these eight were cases of tabes or general paresis and twelve of meningo-vascular syphilis. 10.2% of their cases developed visual troubles with permanent injury in 2.8%. They further stated that pre-existing syphilitic disease of the optic nerve or retina did not preclude the use of tryparsamide but indicated that caution should be used.

Solomon and Viets[7] reported as follows: They have treated 100 cases and their results were not as satisfactory as those of either Lorenz or Moore. In only one case of general paresis has the cerebro-spinal fluid been made entirely negative. Cell counts and globulin have been reduced. The Wassermann reaction in the cerebro-spinal fluid has been reduced in strength but has become negative only in cases of tabes. The colloidal gold curve has been slightly reduced in a number of cases. As regards the clinical results the authors stated that they have had no astounding or brilliant results and they stated that their results with general paresis were not very good or were not any better than by means of older methods of treatment.

Dr. Schaller[8] of San Francisco has treated twenty-four cases of neurosyphilis which had not done well under older methods and of these seventeen were much improved, thirteen of them being back at work. Dr. Cady[9] of St. Louis treated twenty-eight patients with general paresis and taboparesis of whom he said many have returned to work. He said about 85% of his cases improved clinically.

Dr. C. F. Read[10] of Chicago treated thirty-three patients with tryparsamide of whom four were in complete remission and seven in fair condition. His serological results were not very startling. He stated that tryparsamide was not going to restore 50% of our institutional patients with general paresis. Dr. C. A. Neymann[11] of Chicago, treated fifteen patients with tryparsamide, eleven of whom were clinically much improved. All these cases were early cases of general paresis.

Results of Treatment So Far At Whitby Clinic

Through the agency of the Hon. Dr. Godfrey, Minister of Health for the province, we were enabled to secure from the Rockefeller Institute, New York, a limited amount of tryparsa-

mide for the purpose of pursuing an investigation into its effect on cases of neurosyphilis. The drug was obtained early in January of this year and measures were taken to start treatment immediately. We have accordingly used the drug for about nine months. We think that this is too short a period in order to arrive at any very definite conclusion regarding its value. However, we deem it advisable to present a short report of the cases treated so far with the desire of drawing the attention of the profession to the use of the drug and to certain favourable results which we think we have accomplished so far. We have used the drug altogether in fifteen cases. Ophthalmological examinations were first of all made in every patient and in any case where any serious abnormality was reported the drug was not used. From time to time further ophthalmological examinations of the patients were made and in those patients showing objective optic damage the use of the drug was discontinued.

Method of Treatment.—The method of treatment adopted by us was as follows: The patient was given a weekly dose of tryparsamide beginning with 2 grams and increasing later to 3 grams. The same day .1 gm. of mercury salicylate was injected intramuscularly. In some cases spinal drainages were performed occasionally; in others no drainages were done. The number of treatments would consist of eight to fifteen or sixteen followed by a rest interval of six to eight weeks when the treatment was resumed. In eight of the cases neoarsphenamine was given for a few doses until the case was decided to be a suitable one for tryparsamide and in one case neoarsphenamine was alternated with tryparsamide because of the fact that the serology was apparently not being affected by the tryparsamide.

Clinical Results.—Nine of the fifteen cases were advanced cases of general paresis in whom considerable previous treatment with arsphenamine and mercury had been given. Six of the cases were comparatively early cases of general paresis, one of them apparently a case of asymptomatic general paresis. Of the fifteen cases treated, six have shown very definite improvement both physically and mentally. Two of these, however, were in pretty fair shape before tryparsamide was given and it was used for the purpose of keeping them so. Four of the six have gone home and are working and supporting themselves or their families. The other two who have improved are I think capable of supporting themselves, if they could secure positions, which they unfortunately cannot do, owing to conditions of unemployment. Of the total number of patients treated four are dead. In three of these four, the patients were in a very advanced and hopeless condition when treatment was started and received very little treatment as a result. The other patient who died received a full course of treatment, apparently improved both physically and mentally, went home and went to work. His work however was not as efficient as formerly. When the second course of treatment was due, he came down from Toronto, received the first dose of the drug and went home; the next day he developed epileptiform seizures. These seizures were impending before the administration of the drug for he stated that for some days he had felt very sleepy and could hardly keep awake. He had to be brought back to the hospital ultimately and his condition was so poor that I did not think it was advisable to continue with the tryparsamide treatment. In less than a month he began having seizures again and finally passed out in status epilepticus. One other patient died forty-four hours after receiving the first dose of 2 gms. of tryparsamide, in a condition of status epilepticus which began eighteen hours after the treatment. About a week or ten days before he had received the tryparsamide he had had a similar period of status epilepticus lasting for twenty-four hours from which, however, he had recovered. A complete autopsy was performed by Dr. W. L. Robinson and Dr. Julian S. Loudon, of Toronto, who found bronchopneumonia and some congestion of the brain. Nothing was found at autopsy to suggest that the injection of tryparsamide was a factor in the cause of death.

Three of the patients that I have included under the unimproved list of five, show considerable physical improvement but no mental improvement. One of the patients who is markedly improved both physically and mentally is one of the nine advanced cases of general paresis. The other five are from the six comparatively early cases. Of the fifteen cases eight had had extensive previous anti-syphilitic

TABLE I.

ADVANCED CASES OF GENERAL PARESIS TREATED

Name and Case-book number.	*Intravenous injections Neoarsphenamine.*	*Intravenous injections Tryparsamide.*	*Intramuscular injections Mercury Salicylate.*	*No. spinal drainages.*	*Condition upon Commencing Treatment*	*Status Praesens*	*Result of Treatment*	
							Physically	*Mentally*
J. H. B.	0	10	10	8	A case of general paresis with sluggish pupillary reactions, hyper reflexia, slurring speech, grandiose ideas and euphoria. As a result of intensive arsphenamine treatment was apparently on a remission.	Apparently improved very much at first and was able to go home and go to work for a while. Finally, however, developed epileptiform seizures and had to return to hospital where he died, August 20th, 1924.	Very much improved at first but improvement not sustained.	Distinctly improved for period of 4 or 5 months.
R. S. N.	0	19	19	11	Had received very intensive arsphenamine treatment without any result. Was in poor physical condition and in bed.	This patient's physical condition is somewhat better than before treatment. Has gained 13 pounds. However, on account of very severe jaundice is at present in bed.	Considerable improvement except for the jaundice.	Mentally no improvement.
H. L.	0	3	3	3	In very bad physical condition. Sometime previously had had intensive arsphenamine treatment which brought about a marked improvement enabling patient to go home. However, when brought back was much worse than before.	Patient gradually became worse and died on February 24, 1924, two months after his return to the hospital.	No improvement.	No improvement.
F. W. E.	5	13	18	8	An advanced case of general paresis with Argyll-Robertson pupils, slurring speech, hyper-reflexia, expansive ideas and considerable memory defects.	Is apparently upon a remission at the present time and is quite capable of working if he could secure a position. Has been home on probation most of the time since treatment.	Improved.	Very much improved.

TABLE I.—*Continued*
ADVANCED CASES OF GENERAL PARESIS TREATED

Name and Case-book number.	Intravenous injections Neoarsphenamine.	Intravenous injections Tryparasamide.	Intramuscular injections Mercury Salicylate.	No. spinal drainages.	Condition upon Commencing Treatment	Status Praesens	Result of Treatment	
							Physically	Mentally
J. K.	4	8	4	4	An advanced case of general paresis with Argyll-Robertson pupils, drawling speech, absent tendon reflexes, euphoria, memory defects and marked inefficiency.	Patient seems to be a little better both physically and mentally. Seems to understand better. Otherwise not much change.	Slight improvement.	Very little impovement.
E. F. N.	4	6	10	2	An extremely advanced case. Practically helpless in bed. Argyll-Robertson pupils, absence of tendon reflexes, disorientation, memory defects and extreme dementia.	Became gradually more demented and helpless and died on July 14, 1924, about three and a half months after admission.	No improvement.	No improvement.
F. B.	0	1	1	1	Apparently in the last stages of the disease: bed-ridden, disoriented, marked memory defects, extreme irritability, and extreme degree of dementia.	Eighteen hours after the injection began having epileptiform seizures and died 44 hours after injection. Autopsy showed extreme congestion of brain and broncho-pneumonia.	No improvement.	No improvement.
A. M.	0	17	17	9	Had received very intensive treatment with arsphenamine without any improvement at all. However physical condition was fair and was clean in habits.	Patient appears to be gradually going down hill. Is at present very filthy in his habits and mentality practically nil.	No improvement.	No improvement.
N. C.	0	20	20	0	Had received intensive treatment with arsphenamine and had shown considerable physical improvement but little mental improvement.	Is in very fair physical condition and clean in habits. Although a far advanced case of the disease, is still able to be up and help with the work.	Distinctly improved.	Slight improvement.

TABLE II.
COMPARATIVELY EARLY CASES OF PARESIS

Name and case-book number.	*Intravenous injections Neoarsphenamine.*	*Intravenous injections Tryparamide.*	*Intramuscular injections Mercury Salicylate.*	*No. Spinal drainages.*	*Condition upon Commencing Treatment*	*Status Praesens*	*Result of Treatment*	
							Physically	*Mentally*
J. F. B.	3	16	19	0	A case of six months' duration, with ataxic gait, slurring speech, untidiness, confusion and gradually decreasing efficiency.	Patient went home on probation on June 4th, 1924, 3 months after admission, and has remained at home ever since. He has resumed work at his old occupation of traveller.	Considerable.	Much improved.
F. C.	1	9	11	2	Fairly early case with slight speech slurring, sluggish pupillary reactions, slight confusion, memory defects and decreased efficiency.	Patient went home on October 7, 1924, seven months after admission. He is returning to his work almost immediately.	Much improved.	Much improved.
J. D. G.	2	8	10	2	As a result of previous arsphenamine treatment this patient was in a remission, and apparently well. Tryparsamide treatment was undertaken with the idea of sustaining this improvement.	Patient remains well, and has been home on one occasion for three months. He is quite capable of working but is unable to secure suitable work. He has gained six pounds in weight.	Much improved.	Much improved.
H. M. M.	0	11	11	0	Had received considerable arsphenamine treatment and was home working at his usual business as contractor. Was anxious himself to get tryparsamide treatment.	Improvement appears to be sustained. Is still working at his business. States that he feels much better as a result of the tryparsamide treatment, which seems to have a stimulating effect upon him.	Much improved.	Much improved.
H. H.	12	14	25	10	An early case with practically no mental symptoms and in fair physical condition. Two weeks before admission had had a slight seizure.	Went home on March 21st, 1924, two months after admission, and has been working in his old position as a chef ever since. Has gained 28 pounds in weight.	Very great improvement.	Normal mentally .
T. M. McK.	6	10	16	13	Patient had Argyll-Robertson pupils, marked lingual and labial tremors, speech slurring, marked euphoria, expansive delusions, and a history of increasing failure in business judgment.	Patient has shown no improvement mentally or physically. In addition his eye-sight which was poor upon admission, has become gradually worse so that he is almost totally blind.	No improvement.	No improvement.

TABLE III.

SEROLOGICAL REPORT—ADVANCED CASES

Name	Case Book No.	Date	Serology on Commencement of Treatment					Serology at the Conclusion of Treatment					
			Blood Was'n	Cerebro-Spinal Fluid				Date	Blood Wass'n	Cerebro-Spinal Fluid			
				Wassermann	C. Ct.	Globulin	Colloidal Gold			Wassermann	C. Ct.	Globulin	Colloidal Gold
J. H. B.	1398		4 plus	4 plus in .2 c.c.	2	Slightly increased	5543210000	Aug. 8.24	Negative	4 plus in .2 c.c.	2	Slightly increased	0245542110
R. S. N.	1224		3 plus	neg. in .2 neg. in .5 anticomp. in 1 c.c.	7	Slightly increased	5533100000		Negative	3 plus in .2 c.c. 4 plus in .5 c.c.	1	Slightly increased	5555553100
H. L.	1250		3 plus	neg. in .2 2 plus in .5 4 plus in 1 c.c.	5	Slightly increased	5531100000	This patie	nt died be	fore serology could	be	examined after	treatment.
F. W. E.	1565		4 plus	4 plus in .2 c.c.	16	Considerably increased	5555542100		3 plus	4 plus in .2 c.c.	1	Considerably increased	5554332211
J. K.	1612		Negative	Neg. in .2 c.c. Neg. in .5 4 plus in 1 c.c.	5	Slightly increased	5554321000		4 plus	Negative	3	Not increased	1233100000
E. F. N.	1656		4 plus	4 plus in .2 c.c.	1	Considerably increased	5555432210			4 plus in .2 c.c.	0	Not increased	0123321000
F. B.	1531		4 plus	4 plus in .2 c.c.		Considerably increased	4333210000	This patie made.	nt died bef	ore any further	serol	ogical examinati	ons were
A. M.	1104		3 plus	Neg. in .2 4 plus in .5 c.c.	0	Slightly increased	5532210000		Negative	Negative	10	Not increased	1233310000
N. C.	1653		3 plus	2 plus in .2 c.c. 4 plus in .5 c.c.	6	Considerably increased	5555533100		Negative	Negative	0	Not increased	2220000000

SEROLOGICAL REPORT—EARLY CASES

										Serology at the Present Time			
J. F. B.	1643		4 plus	4 plus in .2 c.c.	1	Slightly increased	5555433210		3 plus	4 plus in .2 c.c.	2	Slightly increased	5555543321
F. C.	1650		4 plus	4 plus in .2 c.c.	6	Considerably increased	5553332100		Negative	4 plus in .2 c.c.	0	Slightly increased	5555532100
J. D. G.	1198		2 plus	Negative	2	Not increased	1100000000		Negative	Negative	2	Not increased	0000000000
H. M. M.	1215		4 plus	4 plus in .2 c.c.	4	Considerably increased	5543210 00		4 plus	4 plus in .2 c.c.	0	Slightly increased	3332210000
H. H.	1536		4 plus	4 plus in .2 c.c.	2	Not increased	4111000000		2 plus	3 plus in .2 c.c. 4 plus in .5 c.c.	1	Not increased	0000000000
T. M. McK.	1490		4 plus	Neg. in .2 c.c. 2 plus in .5 c.c. 4 plus in .1 c.c.	4	Considerably increased	5553210000		4 plus	Negative	3	Not increased	4443332100

treatment, and seven had had no previous treatment or a very small amount of treatment with other arsenicals. Of the six cases which are given under the improved list, two were improved by previous treatment and the tryparsamide was given for the purpose of sustaining the improvement which apparently it has done. Six of the patients have increased in weight, one gaining twenty-eight lbs. In the other nine the weight has remained stationary or decreased. Hence summarizing clinical results of the fifteen cases so far treated:

Six have shown marked improvement or maintained improvement—40%.

Four are dead—27%.

Five have shown no improvement or are worse—33%.

Serological Results.—There has been considerable change in the serology following the use of tryparsamide. On the whole, the changes have been for the better. In view of the fact that an improved serology is generally considered to be indicative of organic improvement in the patient the results with tryparsamide have been quite gratifying.

Of the twelve patients in whom complete serological examination could be made, the blood Wassermann test was made negative in six and improved in three more; it was unchanged in strength in two and changed from negative to positive in one. Of thirteen patients in whom the cerebro-spinal fluid could be completely examined the Wassermann test was rendered completely negative in four, kept negative in one, improved in one, unimproved in six, and made stronger in one. The cell count was reduced in nine cases, unchanged in two and increased in two. The globulin was decreased in amount in seven cases and unchanged in six. The colloidal gold reaction was made negative in two cases, lessened in strength in eight cases and made stronger in three cases. Two patients died before a final lumbar puncture could be made and in one patient, death supervened before the blood Wassermann test could be taken following the course of treatment.

Untoward Reactions.—(1) We have had two cases of jaundice, one slight and the other quite severe. One of these has completely recovered from the jaundice and the other is rapidly recovering from it. (2) We had one case showing considerable oedema of the face. (3) Two cases showed marked elevation of temperature to 103° or 104° about eight to ten hours after the treatment. (4) Several of the patients complained of some nausea about eight to ten hours after treatment. (5) Visual disturbances: None of the patients complained of visual disturbance. Two patients have, however, shown signs of developing optic atrophy. In one of these patients the ophthalmologist reports a definite progressive secondary atrophy.

Conclusions

While the number of cases which we have treated is too small and the duration of treatment has been too short to arrive at any very definite opinion from our own results we believe as a result of our experience and the reported experience of other workers that tryparsamide is a valuable drug in the treatment of paretic neurosyphilis. As might be expected it appears to be more effective in the earlier than in the later stages of the disease. We have had no experience of its use in tabes or meningo-vascular syphilis. In reasonably early cases of general paresis it appears to produce greater and quicker improvement than was produced by other methods of treatment. In cases showing optic abnormalities it should be used cautiously and controlled by repeated ophthalmological examination. Statistics collected so far would indicate that the presence of central nervous system disease predisposes to optic damage from the use of this drug.

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PREVENTION AND AFTER CARE OF ACQUIRED HEART DISEASE IN CHILDREN

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THE ordinary practitioner has a two-fold practical interest in heart disease and must ever ask himself two questions. First, how can I prevent the child from developing heart disease? Second, what can I do to help the one suffering from heart disease? That heart disease is a serious problem is easily realized by contemplation of the following figures:—

Population of the United States in 1914 ...	98,781,134
Deaths from tuberculosis	126,440
Deaths from organic heart disease	139,281

and again, a recent report of the Department of Health of the City of New York, covering over 250,000 physical examinations made by school medical inspectors during the year, showed an incidence of cardiac disease of 1.6 per cent. Little reflection on these figures is required to convince one that a national interest in heart disease is of as much importance as in that of tuberculosis. Much has been done to awaken the public conscience in the United States about heart disease but so far practically nothing has been done in Canada, and when one reflects that the problem of prevention can be dealt with by the general practitioner, medical school inspector and other public health officials, the matter becomes of prime importance and altogether dissociated from those problems which are often classed as of academic interest.

In this paper it is proposed to deal more particularly with the etiological factors and after care. The treatment of an acute attack will not be discussed.

All cases of acquired heart disease in children result from infection, and nearly all such infections belong to that great group of undetermined etiology which we, for want of a better word, have labelled "rheumatism". "Rheumatism" is a loose term which may mean something to the lay mind but certainly has not been clearly interpreted by physicians unless it be acknowledged as synonymous with rheumatic fever. Rheumatic fever is defined by Osler as an acute infection dependent upon an unknown infective agent and characterized by multiple arthritis and a marked tendency to inflammation of the endocardium of the valves of the heart. This definition is not sufficiently broad to include the apparent many methods of approach of that one organism which is generally accepted as the cause of so large a number of cases of endocarditis in childhood—although it is worth while remembering there are those who have sought to identify scarlet fever, sore throat, and the rheumatic complex. In this connection Ross Jamieson's contribution to the November issue of the *Journal* is important. An analysis of 670 cases of scarlet fever by him provoked the following statement: "There has been a total absence of evidence which would show the presence of any permanent damage to the heart resulting from an attack of scarlet fever." And again, in his series of 670 cases, he states that there has not been a single patient showing evidence of active endocarditis.

I believe that nearly all cases of endocarditis in childhood have a common etiological organism. In all probability this same organism causes rheumatic fever and chorea; but, the rheumatic fever or chorea is only the manifestation of the locality predominantly selected. Again, one frequently finds on casual examination a chronic endocarditis in a child without any previous definite history of rheumatic fever or chorea, and not infrequently these later develop a well-authenticated attack of rheumatic fever or chorea, or both. Of course many physicians are of the opinion that there has been a previous history of frequent sore throats or so-called "growing pains", but few children go through life without occasional sore throats or pains which by the laity might easily be described as "growing pains". In connection with this observation the following case is of interest.

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Case I.—M. G., aged six years. Admitted to the Children's Memorial Hospital, October 20, 1921, complaining of fever, weak legs, and dyspnoea on exertion. Four days previous to admission she started having difficulty with her breathing on exercise and for the last two days had been confined to bed. The child did not complain of any pain or soreness. There was no history of ordinary infectious diseases of children or of chorea or of rheumatic fever.

Family history.—Father and mother alive and well; six brothers and sisters alive and well; two brothers dead, of which one died from pneumonia and the second from epidemic cerebro-spinal meningitis. One sister died from complications following measles.

On physical examination the heart was found to be moderately enlarged with a typical mitral regurgitant murmur. The mouth showed two carious teeth, and the throat hypertrophied cryptic tonsils. There was no joint involvement. There were no rheumatic subcutaneous nodules, and the spleen was not palpable.

On November 3, 1921, the tonsils were removed and found to be moderately hypertrophied, and she was discharged from the hospital towards the end of December and since January 6, 1922, has attended the out-patient heart clinic. At that time she measured forty-four and one half inches in height and weighed forty-nine and a quarter pounds. The pulse rate was 100 both before and after exercise and the vital capacity, 1000 cc. before and after exercise. She continued to improve and on January 5, 1922, our record shows the following:

Height, 45 inches; weight 52 pounds.

Pulse before exercise, 76; pulse after exercise, 84.

Vital capacity before exercise, 1200 cc.; vital capacity after exercise, 1300 cc.

On January 18, 1924, when she appeared at the clinic, the following note was made:

No complaints.

Height, 48¼ inches; weight, 58½ pounds.

Pulse before exercise, 80; pulse after exercise, 100.

Vital capacity before exercise, 1500 cc.; vital capacity after exercise, 1500 cc.

Heart.—There is a diffuse impulse over the outer and lower part of the precordium. P.M.I. one inch below and in left nipple line. Systolic murmur at apex which is transmitted to axilla. Pulmonary second accentuated. Aortic sounds negative.

Mouth and throat, negative.

She was not seen again at the clinic until March 28, 1924. The mother said that following her last visit to us she had gone to school for five days, but that she had thought school was too much for her and had, therefore, kept her quietly at home as she did not seem so well.

Temperature, 97.4°; height, 48½ inches; weight, 56½ ponds.

Pulse before exercise, 100; pulse after exercise, 130.

Vital capacity before exercise, 1000 cc.; vital capacity after exercise, 1000 cc.

Examination of the heart on this occasion showed enlargement. P.M.I. one-half inch outside the left nipple line. Definite systolic murmur at apex and to-and-fro murmur at third intercostal space just to the left of the sternum. Definite capillary pulse.

The family were against admission to hospital so she was sent home with the usual instructions regarding rest and food. On October 17, 1924, she again appeared at the clinic when she said she had been in town and well all summer. The record on this occasion was:

Temperature, 98.2°; height 49½ inches; weight, 59¼ pounds.

Pulse before exercise, 84; pulse after exercise, 84;

Vital capacity before exercise, 1030 cc.; vital capacity after exercise, 1000 cc.

Heart.—P.M.I. just outside left nipple line in sixth interspace. Systolic murmur at apex which is transmitted to axilla. Diastolic to left of sternum in second intercostal space.

This case is interesting for it gives no definite history of rheumatic fever or chorea; but, an undoubted endocarditis in October, 1921, removal of tonsils in 1921 and in March, 1924, (nearly two and a half years later) a further development of endocarditis in another valve. The weight, pulse and vital capacity were all affected by this second valve involvement, of which the weight and the pulse subsequently returned to their former values.

Or again one encounters a case of chorea which subsequently develops an endocarditis which, in turn, is followed by rheumatic fever.

Case II.—S. T. First seen at the age of eight years, in the autumn of 1919 when he was admitted to the Children's Memorial Hospital with chorea. At this time the physical examination showed moderately enlarged tonsils and heart very slightly enlarged to the left, with a soft systolic murmur at the apex. Six weeks after admission the tonsils were removed, and one week later the child was discharged from hospital practically free of choreiform movements and the heart murmur had almost completely disappeared. In the spring of 1921 he was re-admitted with a typical attack of rheumatic fever during which the heart became markedly enlarged and the systolic murmur at the apex more pronounced and was shortly followed by an aortic diastolic murmur. Under close supervision he was able to "carry on" with fair success until the early summer of 1924, when he was lost track of on account of leaving Montreal to go to live in the United States.

This case is one of several which following chorea had developed rhuematic fever and is also interesting in that the removal of the tonsils seemed to have no effect in arresting the disease.

In order, then, to widen our conception of this syndrome it might be helpful to coin a new term, such as "rheumatic complex", or "rheumatic syndrome", or "rheumatic-chorea syndrome", or "rheumatic-chorea complex", and under some such heading place the following:

1. Frequent sore throats.
2. So-called "growing pains." Myositis.
3. Chorea.
4. Arthritis, including stiff neck.
5. Endocarditis.
6. Subcutaneous nodules.
7. Erythema nodosum?

Symptoms of any one of these groups may be an infection by our hypothetical etiological organism, and a combination of any two is almost certain proof of infection and an indication for careful observation and control of the

patient over a long period of time. It is generally accepted that the path of the "rheumatic complex" infection is through the mouth or throat and, consequently, diseased throats and carious teeth should be treated. The present fashion of removal of tonsils after the appearance of symptoms in the "rheumatic complex" is somewhat like locking the stable door after the steed has been stolen. Neither does it seem probable that by a routine enucleation of the tonsils,—let us say at the age of two years,—the "rheumatic complex" will disappear any more than routine circumcision will prevent masturbation. The reasonable and thoughtful physician will say: "When indicated, circumcision should be performed, and diseased tonsils should be removed." The present fashion of removing tonsils in all cases of the "rheumatic complex" should be condemned.

It is a well-known fact that some diseases have a tendency to appear at irregular intervals and run a certain well-recognized course. And it may be that the up wave of tonsilectomy is coincident with the down wave of the "rheumatic complex". It will be remembered, however, that last winter, on this continent, seems to have been a particularly bad one for the "rheumatic complex" and unfortunately we may be entering upon another period during which more cases will be seen. The experience of last winter has definitely proved that the "rheumatic complex" may appear in children who, as long as five years previously, had their tonsils removed. The following case is presented as illustrative of this point.

Case III.—V. B., aged eleven years. Admitted to the Children's Memorial Hospital, December 14, 1923, with chorea. Tonsils completely removed seven years previously. No history of rheumatic fever, "growing pains", or sore throat. The physical examination revealed, in addition to the choreiform movement, a soft systolic murmur at the apex of the heart which was not transmitted to the axilla. Since discharged from hospital on January 6, 1924, she has been attending the heart out-patient clinic and on the last occasion was free from chorea and the examination of the heart was quite negative.

This case, then, is interesting in that it shows development of chorea seven years after enucleation of the tonsils. Ingerman and Wilson[1] state: "A study of the relation between tonsilectomy and the occurrence of rheumatic manifestations showed that 76 per cent of eighty-eight cases have been followed by recurrence of rheumatic manifestations in from one to eleven years after tonsilectomy. In a control group of ninety-seven cases without tonsilectomy, studied for a similar period, 80 per cent showed recurrence of rheumatic manifestations." And Poynton, Paterson and Spence[2] say: "We believe the throat to be a path of entry of the infection for these reasons: (1) acute tonsillitis may be followed at once by severe and even fatal rheumatism; (2) guillotining of the tonsils when acutely inflamed may be followed at once by an attack of rheumatism; (3) unhealthy conditions of the throat are very frequent in the rheumatic child. This leads us to speak of the enucleation of the tonsils in the rheumatic. This, though a valuable operation in many cases, does not, however, prevent further attacks, upon which point we have valuable facts. In this series there were seventeen examples of rheumatism occurring after enucleation, the operations varying in time from just before an attack to five years previously."

The logical conclusion, then, is that unquestionably every child whom we suspect of definite disease of the heart should be carefully studied with a view to the correction of the diseased tonsils and carious teeth.

In the past, undue emphasis was laid on the refined clinical diagnosis of an acquired heart lesion, and determining the hypertrophy to the decimal point. The introduction of the stethoscope and its subsequent over-use in the hands of the inexperienced, was often responsible for creating cases of so-called heart disease. Recently the pendulum has been swinging to the other extreme and the heart has been investigated from another point of view, i.e., *function*; in other words, as a muscular pump how much work can it do? The American Association of Cardiac Clinics in their last session adopted the following classification:

Class I.—Patients with *organic* heart disease who are *able to carry on* their *habitual* physical activity.

Class II.—Patients with *organic* heart disease who are *able to carry on diminished* physical activity.

A. Slightly decreased.

B. Greatly decreased.

Class III.—Patients with *organic heart disease* who are *unable to carry on any* physical activity.

Class IV.—Patients with *possible* heart disease. Patients who have abnormal physical signs in the heart, but in whom the general picture, or the character of the physical signs leads us to believe that they do not originate from cardiac disease.

Class V.—Patients with *potential* heart disease. Patients who do not have any suggestion of cardiac disease, but who are suffering from an infectious disease which may be accompanied by such disease; e.g., rheumatic fever, tonsillitis, chorea, syphilis, etc.

There is much that commends itself in this classification, for it is simple and can be readily understood by all people, and in addition concerns itself only with the working capacity of the heart. With a classification of this sort in operation, the question of convalescent homes and special classes naturally arises. In my opinion, the group treatment of heart disease is a distinct advantage and should not create neurasthenics, but rather optimists, for who can say that the group treatment has not worked well in tuberculosis, and the problem in heart disease has many points in common with phthisis. Diabetics, nephritics, tuberculars, cardiacs, etc., it would seem as though the future of medicine were bound up in segregation into groups and education of those groups.

One of the most important features in the after-care and treatment of cases of heart disease is an adequate supply of cardiac convalescent homes which should be situated in one of the city suburbs or in the country. In these homes "cardiacs" should be taught how to take care of themselves, and be made to appreciate the physiology of their condition, particularly that too much exercise or stress will result in loss of tolerance. In fact, education should be comparable to that given people suffering from tuberculosis or diabetes. Nowadays, nearly every diabetic knows how to measure tolerance to carbohydrate; but, very few cardiacs have any idea of how to measure their tolerance to physical exertion. And here let it be emphasized that it is most important for the cardiac to get the right amount of the right sort of exercise. In these convalescent homes, also, instruction should be arranged for in those trades and occupations which are suitable for cardiacs, so that each individual should find an occupation which demands of him somewhat less than his maximum, for only in this way can a recurrence be avoided. The habit of making chronic, non-supporting invalids out of cardiacs is very often quite unnecessary.

The operation of a special clinic is simple, particularly so in the case of children. A start may be made by any well-trained physician who is interested. The social service worker is a most important feature in the successful operation of a clinic, for it is she who is responsible for faithful attendance at clinics over a long period of time. All cases should report to the clinic at least every three months. In many instances it is necessary to attend weekly. On the first appearance of a case a detailed history should be procured and a thorough physical examination made, and if possible the case placed in one of the groups. At subsequent visits the assistants should obtain by examination the following facts regarding the patient: (1) weight; (2) vital capacity before and after exercise; (3) pulse rate before and after exercise. Then the patient should come before the physician for examination and particular care should be taken to examine the mouth and throat as well as the heart.

Weight.—In my experience, in children, a careful observation of weight is of extreme importance as we have found that one of the very earliest indications that a case is not doing well is slight loss of weight. Of course in adults, gain of weight in heart disease is not regarded as of particular importance, but invariably in children a gain of weight is of the greatest significance.

Vital capacity.—By this term we mean the volume of air that can be expelled after the deepest possible inhalation. Francis Peabody is responsible for introducing the application of the spirometer in heart disease, and according to him it is of great help in measuring dyspnoea. We have found this test to be of some help but are not yet prepared to say that it is necessary in an estimation of the functional capacity of the heart. However, it must be said that this test is considered by May G. Wilson of New York, as one of the greatest importance in the early detection of oncoming failure.

Pulse rate.—The determination of pulse rate before and after exercise is often of great value.

This test is so well known that it does not require discussion. It may be worth remembering that the old method of running up a certain number of stairs has now pretty well given place to dumb-bell exercise and, in fact, Sir Thomas Lewis only estimates exercise tolerance by the employment of dumb-bells or the "hopping test".

Conclusions

1.—A new term, such as "rheumatic complex" should be adopted to describe a certain group of signs and symptoms frequently met with in children.

2.—Wholesale enucleation of tonsils will not eliminate the "rheumatic complex" although possibly it may minimize its occurrence.

3.—The after-care of heart disease is of extreme importance and convalescent homes and special cardiac clinics should be established to deal with this phase of the cardiac problem.

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A CASE OF TETANY TREATED WITH PARATHYRIN*

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ONE of us (J. B. C.) has recently obtained a highly potent extract of the parathyroid glands of the ox which, it is believed, represents the essential parathyroid hormone[1]. The name parathyrin has been suggested for this active principle derived from the parathyroid glands. It has been found to be a specific for tetany in parathyroidectomized dogs. It has been shown to produce its beneficial effect through an elevation of the level of blood calcium. It is to be expected therefore that parathyrin will be of use in those clinical cases in which blood calcium is known to be subnormal. One such condition is infantile tetany.

It is not possible to draw many final conclusions from the report of one case; but severe rickets and likewise pronounced tetany are not very common in this city so it was thought advisable to report the following case:

C. P., a female child, twenty-two months of age, was the most pronounced case of rickets that we have seen here, and during an attack of broncho-pneumonia there also appeared characteristic signs of tetany. She was treated with a parathyroid extract and is consequently the first case of tetany to receive this treatment.

She was born at full term with normal delivery and weighed six and a half pounds. For two weeks she was nursed but the breast milk became less and less and she was placed on a boiled modified milk formula. She apparently did only fairly well for at eleven months she was said to be at her best, "fat but small", and weighing approximately fifteen pounds. At this time the mother deserted the home and the baby was placed in a nursing home. Here she contracted measles and is reported to have had a temperature of a 104° for three days. Her food while there was principally bread and milk. She became very thin and weighed about twelve pounds at fourteen months of age. In another home she did well at first and then developed an acute intestinal indigestion.

At eighteen months of age, she was first seen by one of us, (D. B. L.) and was a miserable looking infant. Her length was twenty-six and a half inches, weight twelve pounds four ounces. Her general appearance was that of a markedly rachitic infant. The head was almost natiform in shape and the fontanelle still admitted one finger. There was only slight craniotabes. The teeth were seven in number and in good condition. The chest was small with a marked Harrison's sulcus and the rosary was so pronounced that it was very plainly visible. The abdomen was very prominent. The liver

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was palpable 1½ cms. below the costal margin and the spleen was just palpable. The epiphyses was so enlarged that the wrists and ankles appeared to be quite deformed. The stools were loose, and contained considerable mucus. She was placed on powdered protein milk, and as soon as the intestinal condition permitted,—cereals, egg, cod liver oil and fruit juices were added, and she was instructed to be kept as much as possible in the sunlight.

Up to twenty-two months she gradually improved in appearance and the weight increased to fifteen pounds twelve ounces. On December 1st, 1924, she began to vomit and seemed feverish. The following day the breathing became rapid and occasionally there was a slight expiratory grunt. The temperature was 100° (groin). There were moist râles over each chest posteriorly, and the breath sounds were slightly higher pitched on the left side.

December 3rd, 1924. The general appearance of the infant was not so good. She was restless and irritable all the preceding night and had little sleep. The respirations were sixty per minute and the pulmonary signs were as on the preceding day. It was noticed at this time that she had marked carpopedal spasms. There was a very decided Chvostek phenomenon and the reflexes were hyperactive. Toward evening her condition was still worse, the spasms of the hands and feet were much more tense than at the previous visit. At midnight she was given 1 cc. of parathyroid extract hypodermically. No other medication was being given at that time except sinnapisms to the chest.

December 4th, 1924. The nurse volunteered the information that the baby was considerably better and reported that in one hour after the injection, she seemed to be more comfortable, and less irritable, it also had a good night's rest. On examination the child certainly looked considerably improved. The spasms of the hands and feet had considerably relaxed so that the fingers and toes could be easily moved, but there remained still a slight tendency to extension of the phalanges. The respirations were forty per minute and the moist râles in the chest were finer and not nearly so numerous as on the previous day. She was again given (hypodermically) 1 cc. of the extract.

Toward evening of the same day all evidence of spasm in the hands and feet had disappeared. The Chvostek phenomenon could barely be elicited, and the reflexes were more nearly normal. She was again given 1 cc. of parathyroid extract hypodermically.

December 5th, 1924. The temperature was normal and only a few fine crepitant râles were heard at each base posteriorly, more marked on the left side. No evidence of tetany could be obtained. At this point it was thought advisable to discontinue the hypodermic use of the extract and so for the next four days, it was given by mouth, 1 cc. twice a day, and finally for ten days 1 cc. by mouth daily. A week has now passed since she received her last dose of extract. She has still continued to improve and no further evidence of tetany has developed.

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Colonic Anesthesia.—The statistics of 149 consecutive cases of colonic anesthesia with an ether-oil, paraldehyde mixture, are reported by Herbert Willy Meyer, New York, and Burtis F. Robbins, Salt Lake City. In many instances these cases were far advanced carcinomas, and were poor operative risks. In such cases Meyer and Robbins believe that colonic anesthesia is ideal. Instances which have been reported as accidents with colonic anesthesia they attribute to some error or faulty modification in technic. Postoperative pneumonia is sometimes seen; this, however, is not the result of the anesthesia but occurs in those cases in which there has been surgical intervention, in the mouth or the pharynx. The two deaths occurring in this series of cases are attributed to suffocation from the falling back of the tongue after the patients had been returned to bed. The authors emphasize that a patient who is still unconscious following colonic anesthesia should not be allowed to lie on his back, and should be watched constantly by a nurse.—*Jour. Am. Med. Ass.*, Nov. 15, 1924.

Case Reports

A CASE OF DIABETES WITH TUBERCULOSIS*

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Hamilton

I desire to report a case of severe diabetes in a girl of sixteen, who at one time suffered from active tuberculosis and who has been under observation for seventeen months. On March 4th of this present year, she became unconscious from an overdose of insulin and remained in this condition for thirty hours. I cannot hope in the time available to give the complete story, but I have prepared a few charts illustrating typical days in the progress of the diabetes, the story of the sudden unconsciousness and her subsequent history showing how we have been able to avoid further accidents.

This patient first came under observation on January 6th, 1923. Dr. Storms, her family doctor, asked Dr. Holbrook of our sanatorium staff to examine her as a suspected case of tuberculosis. At that time she was running a high temperature, and had cough with morning sputum occasionally streaked with blood. For some time previously she had been doing heavy work, clerking in a store, and had had what was considered a common cold for over two weeks. Her mother had died of tuberculosis (with laryngeal complications) when she was three years old. She was thin, under-developed, and physical signs showed tuberculous involvement of her lungs. At the time of this examination her breath had a heavy odour of acetone and samples of urine and sputum were taken for examination. The urine showed a high percentage of sugar and ketone bodies, and the sputum tubercle bacilli.

The decision was made to have her admitted to the sanatorium, which was effected on January 22nd, 1923. On admission she gave a history of extreme languor, excessive thirst and a dry mouth for over a year, frequent headaches, a large appetite, constipation, but an excessive quantity of urine; menstruation had never been regular; amenorrhoea had occurred since June. At this time she weighed eighty-two pounds in her clothes. The report of a radiological examination on January 23rd, 1923 was:

Left lung.—Heavy hilus shadow and marked peribronchial infiltration throughout. The vertical bronchus can be traced to the periphery. There is a small calcified nodule in the eighth interspace in the posterior axillary line about three-quarters of an inch from the pleural surface.

Right lung.—Excessive peribronchial infiltration in the lower 3/5. A fan of fine tubercles extends from the hilum nearly to the periphery in the fourth and fifth interspace in the axillary line.

A progress report from the sanatorium staff on February 23rd, 1923, stated: "When she was admitted in January, physical examination of the chest showed some high pitched breathing over the right upper lung but no râles were heard. Her temperature remained normal for the first two weeks and apparently at that time the lung condition was of secondary importance to the diabetes. X-ray examination, however, showed a definite parenchymatous lesion at the level of the 4th interspace on the right side. The day after admission she was excreting over 500 gms. of sugar in the urine, with acetone present. The diet was reduced and later she was starved for four days and the sugar fell to 3 gms. with acetone present. Then she was given a very low carbohydrate diet and the sugar output again increased. Apparently she is not doing well on this, for now dry râles are distinctly heard over the upper one-third of the right chest and she is running frequently a light amount of fever."

On March 11th, she was transferred to the General Hospital in a very weak condition, much reduced in weight, only 65 lbs. and with abundant sugar and ketones in the urine.

See Chart No. I.

As the chart indicates, she was placed on a regulated diet and gradually reduced to two fast days; after ten days she was without a trace of sugar in the urine and had one plus acetone. After this, on three successive days she was given ten units of insulin; later two doses of fifteen units on separate days, but

*The writer wishes to acknowledge the assistance which he received from the interns, laboratory and other staff of the Hamilton General Hospital which made these records possible.

CHART No. I

Date	URINE							BLOOD		FOOD INTAKE						Insulin	
	Vol. cc	R	Sp. G	Sug. Gms.	Ketones SNP	Ketones FeCl	Tot. Nit.	Sug.	CO	Prot.	CH	Fat	G	Tot. Cal.	Wt.	Time	Uts.
1923																	
March 12...	1645	H	35	4+	4+	4+	–	–	–	Regular ward diet					–	–	–
" 16...	1320	H	20	66	4+	4+	–	330	–	34	82	43	116	861	–	–	–
" 20...	1740	H	15	14	+	tr	–	350	–	6	31	2	35	61	–	–	–
" 22...	1810	H	05	tr	tr	0	–	–	–	Fast		day	–	–	–	–	–
" 23...	1640	H	05	tr	tr	0	–	–	–	Fast		day	–	–	–	–	–
" 26	1630	N	10	22	tr	0	–	–	–	13	14	19	22	280	–	–	–
" 29...	810	H	10	tr	0	0	–	263	69	36	19	42	45	605	67	8 a.m.	15
" 31...	1100	H	15	10	+	0	–	–	–	21	24	78	44	892	68	–	–
April 1...	1800	H	11	20	0	0	–	–	–	22	27	85	48	908	68¼	–	–
" 2...	2150	H	15	26	0	0	–	–	–	24	34	85	55	1005	68¼	–	–
" 4...	1800	A	10	30	0	0	–	–	–	20	44	119	73	1335	–	–	–

NOTE:—"H" represents acid, "N" neutral and "A" alkaline. Unless otherwise indicated the blood sugar column shows the morning fasting level. Those accustomed to read the blood sugar in percentage should place a decimal point before each number shown. "G" equals available glucose. The time column indicates the time at which insulin was given or the number of doses per day and the unit column shows the number of units per day.

CHART No. II

Date	URINE							BLOOD		FOOD INTAKE						Insulin	
	Vol. cc	R	Sp. G	Sug. Gms.	Ketones SNP	Ketones FeCl	Tot. Nit.	Sug.	CO	Prot.	CH	Fat	G	Tot. Cal.	Wt.	Time	Uts.
1923																12 n.	5
April 5....	1640	A	06	14	0	0	–	–	–	19	32	118	55	1274	68	5 p.m.	5
" 7....	1840	N	04	v.s.t.	0	0	–	153	–	"	"	"	"	"	69¼	1d	20
" 9....	680	N	13	0	2+	+	–	114	–	19	39	119	62	1308	68¾	2d	15
" 13....	1930	N	05	0	+	tr	–	162	–	23	68	94	91	1219	68¾	2d	10
" 17....	2070	N	10	0	tr	0	–	–	–	52	82	133	125	1742	69	2d	10
" 25....	2000	A	10	0	tr	tr	–	248	–	87	89	156	155	2112	71¼	3d	20
May 1....	1740	A	10	2	+	0	–	296	–	71	91	183	150	2305	74½	3d	10
" 7....	1250	A	10	0	tr	0	–	266	–	65	42	136	93	1658	75½	2d	10
" 14....	1840	A	10	0	tr	0	–	189	–	72	64	137	120	1784	75½	2d	10
" 22....	1600	N	10	0	tr	0	–	180	–	"	"	"	"	"	79	3d	15
June 1....	1950	N	15	0	tr	0	–	200	–	"	"	"	"	"	82¼	3d	24
" 8....	2100	N	10	0	0	0	–	–	–	49	62	155	106	1843	84¼	3d	24

CHART No. III

Date	URINE							BLOOD		FOOD INTAKE						Insulin	
	Vol. cc	R	Sp. G	Sug. Gms.	Ketones SNP	Ketones FeCl	Tot. Nit.	Sug.		Prot.	CH	Fat	G	Tot. Cal.	Wt.	Time	Uts.
1923																	
Oct. 17....	1250	N	30	21	4+	2+	–	240	–	43	33	153	73	1699	99	2d	20
" 19....	1400	A	25	14	+	tr	–	272	–	30	35	119	65	1338	99	2d	20
" 23....	1400	N	22	12	3+	tr	–	255	–	"	"	"	"	"	99¾	2d	25
" 26....	1250	H	25	8	2+	tr	–	272	–	"	"	"	"	"	98½	2d	25
" 27....	1100	H	22	0	tr	0	–	–	–	"	"	"	"	"	101	2d	30
Nov. 1....	1050	H	20	0	tr	0	–	–	–	"	"	"	"	"	100	2d	35
" 3....	850	H	16	0	2+	tr	–	224	–	"	"	"	"	"	–	2d	40
" 5....	1950	H	15	0	+	0	–	184	–	"	"	"	"	"	101	2d	40
" 7....	2050	H	15	0	+	0	–	172	–	"	"	"	"	"	101	2d	40
" 9....	1800	H	20	0	+	0	–	220	–	"	"	"	"	"	101	2d	45
" 13....	1000	H	20	0	tr	0	–	196	–	"	"	"	"	"	102	2d	45
" 15....	1300	A	15	0	tr	0	–	192	–	"	"	"	"	"	101	2d	45

as no more was available, the dietary methods were continued and the diet gradually increased until April 5th, when a regular supply of insulin became available. With the use of insulin, it was possible to still further increase the diet without sugar in the urine. She was discharged on June 8th, weighing 84 lbs. During this hospital stay the protein in the diet was carried to almost 3 gms. per kilo.

See Chart No. II.

During the hospital stay, she was thoroughly trained in methods of weighing and controlling her diet and administering her insulin. In spite of these instructions, during the summer while on holidays out of town, she became careless regarding her diet and frequently had sugar in the urine and later the blood showed a high sugar content. She was therefore readmitted on October 16th, weighing 99 lbs, but with a much reduced tolerance and with sugar

CHART NO. IV

Date	URINE							BLOOD		FOOD INTAKE						Insulin	
	Vol. cc	R	Sp. G	Sug. Gms.	Ketones SNP	Ketones FeCl	Tot. Nit.	Sug.		Prot.	CH	Fat	G	Tot. Cal.	Wt.	Time	Uts.
1924																	
Feb. 12....	1500	N	10	0	tr	0	–	226	–	30	33	119	63	1332	96	3d	80
" 13....	1300	N	05	2.3	tr	0	–	080	4pm	"	"	"	"	"	97	3d	90
" 16....	1900	N	10	0	0	0	–	–	–	"	"	"	"	"	98	3d	89
" 18....	2000	N	04	0	?	0	–	188	–	"	"	"	"	"	99	3d	92
" 21....	1500	N	10	2.5	?	0	–	081	4pm	30	39	128	70	1437	99	3d	96
" 25....	3100	H	10	0	?	0	–	240	–	31	47	149	81	1668	99	3d	104
" 27....	2350	N	02	0	?	0	–	–	–	"	"	"	"	"	101	3d	110
" 28....	1000	H	15	0	0	0	–	252	–	"	"	"	"	"	101	3d	115
" 29....	2350	N	07	0	0	0	–	–	–	30	55	158	88	1771	103	3d	120
March 1...	2150	N	05	0	0	0	–	207	–	"	"	"	"	"	103	3d	124
" 2...	2100	N	20	0	0	0	–	–	–	37	55	170	93	1903	103	3d	130
" 3...	1750	N	15	0	0	0	–	–	–	"	"	"	"	"	105	3d	130

CHART V.

Date	*Remarks*	*Weight*	*Avail. Glucose*	*Blood Sugar*	*Urine Sugar*	*Insulin*
March 4	Diet—Protein—37, CHO—55, Fat—170, Total—1903. Evening meal not given	104	62	0	...	130
6.00 p.m.	Patient was given evening dose of insulin—35 units	...	..	..	...	...
6.15 "	Patient complained of being tired, lay down on her bed and with difficulty was given orange juice—45 cc	...	7.5	..	...	...
6.20 "	By the time the orange juice was given she was unconscious and in a state of tonic spasm with legs and body extended, arms extended close to the side with hands clenched. Head was retracted, eyelids wide open, eyes turned to the right and fixed, pupils fully dilated not reacting to light, jaws set, cheeks flushed, hair damp, extremities cold, radial pulse scarcely palpable and very rapid, the respirations normal rate but very shallow	...	..	..	...	...
6.30 "	(1-1000) Adrenalin min. 8 per hypo. Immediate violent convulsion lasting one minute. Became relaxed but very restless, ground teeth, screamed and cried for about five minutes. During this time her pulse increased in volume, pupils were contracted to normal	...	..	..	...	...
6.45 "	Pure glucose, 15 c.c., given by mouth, became very negativistic before more could be given	...	15	..	...	...
7.00 "	Intravenous glucose 25 c.c. 10% solution. Became very negativistic with difficulty in keeping needle in vein, screamed considerably but gradually became quiet	...	2.5	..	...	...
8.20 "	Patient came out of reaction, smiled and answered a few questions	...	..	..	...	...
8.30 "	Again became unconscious, pulse and colour still good	...	..	.030	...	...
	Adrenalin, Min. 5 per hypo	...	..	..	...	...
	Intravenous glucose, 45 cc. 10% sol	...	4.5	..	...	...
9.30 "	Intravenous glucose, 50 cc. 5% sol. At this time the patient was very hard to rouse, very negativistic, twitching, very restless. The effect of the adrenalin was not as good as the first administration. Orange juice 45 cc. plus sugar 4 gms.	...	2.5 11.5	..	...	...
10.00 "	Glucose 120 cc. per rectum, 5% sol	...	6	..	...	...
10.30 "	Interstitial glucose, 50 cc. 5% sol	...	2.5	..	...	...
11.00 "	Pure glucose, 90 cc. nasal tube	...	90	..	...	...
12.00 "	Patient still unconscious	...	..	.080	?	...
	TOTAL DAY'S RECORD	...	204	..	?	130

CHART V.—(*Continued*)

Date	*Remarks*	*Weight*	*Avail. Glucose*	*Blood Sugar*	*Urine Sugar*	*Insulin*
March 5						
1.00 a.m.	Glucose 30 c.c. by nasal tube	...	30	..	...	...
2.00 "	Patient still unconscious, reflexes sluggish	...	..	.096	...	...
5.30 "	Patient shivering violently, semi-conscious. Adrenalin min. 5 hypo. Pure Glucose, 30 cc. by mouth. Swallowed easily and stopped shivering	...	30	..	...	...
8.30 "	Patient still unconscious	...	..	.295	...	...
9.00 "	Glucose solution by nasal tube. 180 gms. within an hour	...	180	..	...	...
10.00 "	Retention catheter inserted, 60 ounces of urine collected, and evidently more had been lost during the night involuntary	...	..	..	36	...
10.00 "	Urine for test and insulin given	...	..	..	4+	5
March 5						
12 noon	Urine for test. Insulin given	...	..	..	4+	5
	Blood chemical	...	..	.242	...	...
2.00 p.m.	Urine for test. Insulin given	...	..	..	4+	5
3.00 "	Urine for test. Insulin given	...	..	..	4+	5
3.30 "	Blood chemical	...	..	.345	...	...
4.00 "	Urine for test. Insulin given	...	..	..	2+	5
5.00 "	Urine for test. Insulin given	...	..	..	1+	5
5.30 "	Blood chemical. Patient appears a little brighter. Patient resents face being slapped	...	..	.188	...	...
6.00 "	Urine for test. Insulin given. Patient swallowed 5 ounces water	...	..	..	1+	5
7.00 "	Urine for test. Insulin given	...	..	..	1+	5
8.00 "	Condition much improved but still unconscious. Urine for test. Insulin given	...	..	..	tr.	5
	Glucose solution, 5 gms. by mouth	...	5	..	...	...
9.00 "	Urine for test. Insulin given	...	..	..	v.s.t.	5
10.30 "	Urine for test. Insulin given. Glucose 5 gms. by mouth	...	5	..	v.s.t.	5
11.00 "	Urine for test. Patient still unconscious	...	..	..	0	...
11.30"	Patient appeared to be asleep, attempts at rousing, awoke suddenly, answered questions and was apparently normal	...	..	..	...	...
	TOTAL FOR DAY	...	250	..	36x	55
March 6						
1.00 a.m.	Patient still bright when spoken to	...	..	..	...	...
2.00 "	Urine for test	...	..	..	0	...
	Glucose gms. 5 by mouth	...	5	..	...	...
2.30 "	Blood Chemical	...	..	.076	...	...
3.00 "	Glucose 5 gms. by mouth. During the night water was taken freely every hour	...	5	..	...	...
8.00 "	Balance of 24 hour urine	...	..	..	28	...
8.30 "	Blood Chemical	...	..	.188	...	...
	Patient given regular diet	...	..	..	...	...
	Protein—30,CHO33, Fat—119, Total—1,332	...	63	..	...	...
	TOTAL FOR DAY—Urine sugar and insulin and G	...	73	..	28	30

and much acetone and diacetic acid in the urine. On this occasion she was placed on an estimated basal diet (Toronto method). During this stay her insulin dosage was increased till the urine became free from sugar, but after it had been free for three weeks, she insisted on leaving the hospital on November 15th, although her blood sugar had not been brought down to a normal level.

See Chart No. III.

After her discharge she, presumably, remained on the same diet, but in spite of a further increase in insulin dosage, the blood sugar gradually increased until reports stated that it was near the 300 mark, when she was again persuaded to re-enter the hospital on February 12th, 1924. As her old infection was considered a possible cause for requiring a larger dosage, and after consultation with one of the Toronto physicians, it was decided to increase the dosage as rapidly as advisable, and at the same time to increase the diet by 600 calories, all accurately measured and controlled by the strictest supervision.

See Chart No. IV.

On March 4th, 1924, the third day of a diet of 1903 calories, and on an insulin dosage of 130 units, she suddenly became unconscious after her evening dose of insulin before her meal could be served. As records here shown indicate, she remained in this condition thirty hours, and not until more insulin had been given in order to assist in metabolizing the excess of sugar then in her blood, did she wake up.

See Chart No. V.

CHART No. VI

Date	URINE							BLOOD		FOOD INTAKE						Insulin	
	Vol. cc	R	Sp. G	Sug. Gms.	Ketones SNP	Ketones FeCl	Tot. Nit.	Sug.		Prot.	CH	Fat	G	Tot. Cal.	Wt.	Time	Uts.
1924																	
March 6...	1150	H	10	0	?	0	–	188	–	30	33	119	63	1332	–	3d	30
" 7...	1300	H	10	5.2	tr	0	–	228	–	30	39	139	71	1533	–	3d	55
" 8...	1950	H	10	6.8	?	0	–	320	–	30	45	159	78	1739	97	3d	70
" 9...	1600	H	05	5.6	?	0	–	350	–	30	49	178	84	1922	98	3d	100
" 10...	2100	H	05	0	?	0	–	240	–	39	49	188	90	2000	99	3d	105
" 11...	2550	H	12	1.6	0	0	–	240	–	"	"	"	"	"	99	3d	110
" 12...	1600	H	10	0	0	0	–	272	–	"	"	"	"	"	98	3d	115
" 13...	1750	H	10	?	0	0	–	228	–	"	"	"	"	"	99	3d	100
" 14...	2100	H	10	0	0	0	–	254	–	"	"	"	"	"	99	3d	100
" 15...	2050	H	12	0	0	0	–	268	–	"	"	"	"	"	100	3d	100
" 17...	1900	H	20	0	0	0	–	225	–	"	"	"	"	"	100	3d	90
" 18...	1800	N	15	0	0	0	–	268	–	"	"	"	"	"	100	3d	90

With reference to this sudden collapse into unconsciousness, there are a few questions I would like to have answered:—(1) Why did the sudden collapse take place on the third day and not on the first when she was on the same diet and dosage? (2) Does insulin accumulate? (3) During this period 460 gms. of glucose were given in various forms, and only 64 gms. were recovered from the urine; where did the balance go? (4) What was the cause of her persistent unconsciousness in spite of the rising blood sugar? (5) Was it due to an indiscreet use of adrenalin? (6) Did the adrenalin force out all the storage sugar? (7) Did the adrenalin produce a vasomotor spasm, (especially in the brain) or did the insulin cause some direct injury to the nervous tissues? (8) Was she an "insulin waster"?

After the above experience, her diet was again rapidly increased and by March 12th, 1924, she was getting 2,000 calories and 115 units of insulin . In spite of this her blood sugar level remained high. In the next stage, her insulin, instead of being given thirty to sixty minutes before meals was given immediately after meals and in addition the food ration (protein, 39; carbohydrate, 49; and fat, 188; total calories, 2,000), was given in equal portions of protein, fat and carbohydrate for each of the three meals and insulin dosage was given 30—30—30.

See Chart No. VI.

On the third day the insulin was slightly increased, 32—32—32. On the fourth day of this diet, a series of frequent examinations of the blood sugar were made in one day, in order to discover the relations of the meals and the administration of the insulin to the blood sugar curve. The following table shows what happened.

CHART No. VII

THIS RECORD SHOWS THE RELATION OF FOOD AND INSULIN TO THE BLOOD SUGAR CURVE

Diet—Protein—98, CHO—49, Fat—189, Avail G.—90, Calories—2589, given in three equally divided portions.

March 20	REMARKS	G	I	B.S.
8.00 a.m.	Blood Chemical	–	–	240
9.00 "	Insulin	–	32	–
	Breakfast	30	–	–
10.40 "	Blood Chemical	–	–	208
11.40 "	Blood Chemical	–	–	105
12.45 p.m.	Blood Chemical	–	–	132
1.00 "	Insulin	–	32	–
	Dinner	30	–	–
2.25 "	Blood Chemical	–	–	087
4.25 "	Blood Chemical	–	–	081
5.25 "	Blood Chemical	–	–	080
6.25 "	Blood Chemical	–	–	074
7.00 "	Supper	30	–	–
8.00 "	Insulin	–	30	–
8.25 "	Blood Chemical	–	–	105
9.25 "	Blood Chemical	–	–	128
March 21				
8.00 a.m.	Blood Chemical	–	–	207

On the basis of these results and in the hope that we might be able to maintain more easily a low sugar level, through both day and night, we divided the food ration into four equalized portions with four doses of insulin, (20—20—10—10). In the presence of a low afternoon blood sugar (067) and as the patient rebelled against the many punctures, the 4 p.m. dose was soon omitted and the daily dose of insulin slightly increased (85 units), the last dose being given one hour after the evening meal. Soon after this the afternoon meal was made to consist of

one-half the value of each of the other meals, and later this meal was made of little food value, (broth and bran buns).

her discharge, by giving the noon dose of insulin one-half hour after her meal, it has been possible to reduce the dosage to 75 units per

CHART No. VIII

Date	URINE							BLOOD		FOOD INTAKE						Insulin	
	Vol. cc	R	Sp. G	Sug. Gms.	Ketones SNP	Ketones FeCl	Tot. Nit.	Sug.		Prot.	CH	Fat	G	Tot. Cal.	Wt.	Time	Uts.
1924																	
March 21...	1800	H	10	0	0	0	–	207	–	39	49	188	90	2000	102	4d	60
" 22...	1500	N	10	0	0	0	–	284	–	"	"	"	"	"	103	–	80
" 23...	1900	N	10	0	0	0	–	216	–	"	"	"	"	"	104	–	80
" 24...	2450	N	08	0	0	0	–	180	–	"	"	"	"	"	104	–	80
" 25...	2000	N	15	0	0	0	–	160	–	"	"	"	"	"	104		70
" 26...	2500	H	10	0	0	0	–	160	–	"	"	"	"	"	103	3d	75
" 27...	2600	H	10	0	0	0	–	180	–	"	"	"	"	"	103	3d	79
" 28...	2800	H	12	0	0	0	–	240	–	"	"	"	"	"	104	3d	81
" 29...	1850	N	10	0	0	0	–	186	–	44	48	160	89	1813	103	3d	80
April 1...	2100	H	15	0	0	0	–	176	–	48	48	130	89	1561	103	3d	85
" 2...	1950	H	15	0	0	0	–	132	–	"	"	"	"	"	103	3d	85
" 28...	2000	H	12	0	0	0	–	114	–	60	55	140	104	1727	104	3d	80

We maintained this method for one month, while she was still in hospital under close observation. During this time the fat was reduced from 180 to 140 gms., the protein increased from 39 to 60 gms., the carbohydrate from 49 to 55 gms., thus changing the available glucose from 90 to 104 gms. The patient was discharged on April 28th, weighing 104 lbs, and receiving 80 units of insulin a day. Since

day, and still have a low morning blood sugar, without change in the diet. She now weighs 113 lbs., is in excellent health, and in the best of spirits and vitality. This evidence taken with the physical signs and chest radiographs, I believe shows a complete cure so far as the tuberculosis is concerned, and the diabetes to be under reasonable control with the aid of insulin.

MULTIPLE FIBROMATA—A CASE WITH ONE FIBROMA ENLARGING INTO THE STOMACH*

E. SHOULDICE, M.B., (Tor.)

Toronto

The case I have to report to you to-night is one of much clinical interest, partly from its rarity and also on account of the complexity of the symptoms rendering diagnosis difficult. Patient Miss L. W.; age 41; was born in Canada; her occupation has always been housework. The family history contains nothing of relevance. Father died at the age of 84. Mother died from heart trouble at the age of 59 years. One brother died suddenly; cause unknown. Two sisters are both in good health.

Past History.—She had chicken pox early in life and a severe attack of scarlet fever when she was six years old. She states that she was tall and strong for her age before her attack of scarlet fever, but she did not grow well after that. Her sisters are much taller and larger than she is. She had measles when 14 years old. At the age of 17 she, for the first time, noticed small multiple tumours on her hands and arms. These tumours have changed very little. When she was 24 years old some of them began to enlarge, especially one on her right hand and one on her right foot. In about eighteen months they had grown to the size of about 2 cms. in diameter and had become painful. They were therefore removed by a surgeon. When she was 30 years old she suffered much from excessive menstruation for which the uterus was curetted. At the age of 35 the uterus was removed on account of profuse hæmorrhage. Three years later she began to have trouble from her stomach but did not seek medical aid till a year later. Her symptoms then were suggestive of gastric ulcer, *viz.*, pain on eating;

*Read before the Section of Surgery, Academy of Medicine, Toronto, March 20th, 1923

occasional vomiting, and attacks of "gas on her stomach," at the same time she felt very weak. These attacks lasted two or three weeks at a time and recurred every four or six months. Between the attacks she was fairly well. There was never any sign of blood in her stools until shortly before entering hospital.

Present History.—This patient came under my care for the first time on August 2nd., 1920, complaining of epigastric pain after eating, gaseous eructations and weakness. The symptoms were relieved temporarily by an ant-acid bismuth mixture followed later by an iron tonic under which she regained strength. A Wassermann test was made at the time and proved negative. In November she returned for further treatment and at this time the pigment in the skin was so marked as to suggest jaundice. In

FIG. I.

Note the ulcerated condition of the exposed end of the sessile tumour, from which haemorrhages occurred.

FIG. II.

X-ray diagnosis. Benign intragastric neoplasm. Note the small, faint outline of barium indentated around the base of the tumour. On palpation the tumour was freely movable in the cavity of the stomach.

FIG. III.

Section from one of many small tumours of the skin. The tumour is apparently non-encapsulated. Note the tangled masses of fairly typical fibroblasts with large quantities of collagen fibrils. The cells are loosely arranged and the tumour shows no evidence of malignancy.

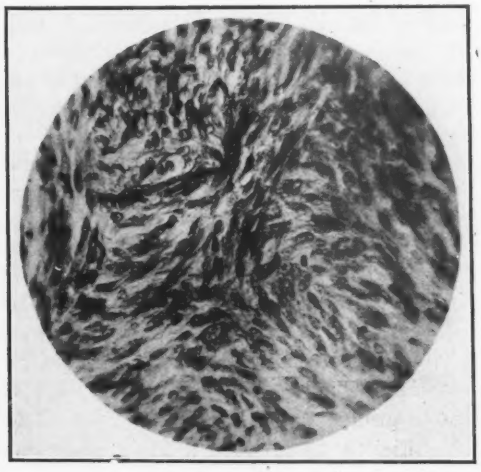

FIG. IV.

Fibro-myxo-sarcoma. Low-power section of tumour of stomach. Note the very cellular character, with whorls, and fan shaped masses of atypical cells, which are apparently differentiating out as fibroblasts.

June, 1921, she again consulted me. The anæmia was marked but regarded as secondary. Hæmoglobin was 35% and the red blood cells 3,400,000. Under treatment the anæmia rapidly improved. At this time I regarded the anæmia as due to a slow hæmorrhage from a gastric ulcer and I advised her to enter the hospital. In May, 1922, the patient developed another severe attack for which she was placed in the hospital where a diagnosis was made of an inoperable carcinoma of the stomach. After four weeks the patient returned home and under treatment gradually improved until she was considered fit for operation, when she re-entered the hospital under my personal care July 6th., 1922. After consideration of the x-ray work done during her previous stay in the hospital, I made the diagnosis of multiple neuro-fibromata. I thought it probable that one of these many fibromata had become enlarged and had given rise to the tumour noticed under the x-ray during her previous stay in the hospital. The mucosa of this tumour, in my opinion, intermittently became eroded and ulcerated, causing haemorrhage, thus producing cachexia and anæmia with increased skin pigmentation. The bleeding had never been sufficient to produce vomiting but on one occasion was sufficient to produce a black stool. On July 7th. laparotomy was performed; the abdominal contents appeared normal except for the peculiar appearance of dozens of small white fibrous tumours about the size of millet seeds all over the stomach. In the greater curvature of the stomach, right at the attachment of the gastro-colic ligament we found the mass shown in the x-ray plates and described by Dr. Dickson. It was easily removed, by going wide of its base in the more normal stomach wall. The patient's recovery was rapid and uneventful. There were no clinical signs of malignancy. There has been no return of gastric symptoms to date. She has been working steadily and is in good health two years after the operation.

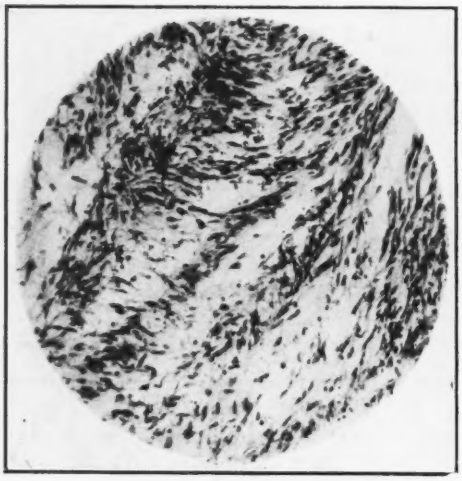

FIG. V.

Note the myxomatous changes shown in this section of the tumour.

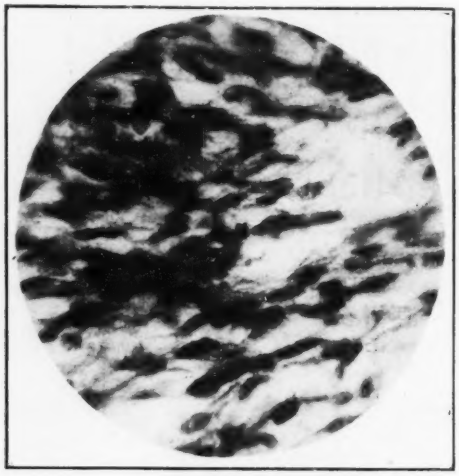

FIG. VI.

High power of same tumour of stomach. Note the mitotic figure and the atypical character of the cells.

Discussion

This affection has received many different names from different writers: General neuro-fibromatosis; multiple neuro-fibromata; elephantiasis neuromatosa. The anatomical characteristics of the affection has been variously described. Heaton[1] thus described a case under his care, "The vagi nerves were markedly affected, and in places were thicker than the index finger. In their whole length from the skull to the stomach they showed diffuse thickening and at intervals distinct fusiform swellings. The ramifications on the surface of the stomach were thick and tortuous and presented many nodular swellings varying in size from that of an almond downwards. The phrenic nerves and sympathetic were similarly affected." Preble and Hektoen,[2] write: "Thus both pneumogastrics and their connecting and

other branches carry innumerable tumours that appear to spring from the peri- and endoneurium." Anderson[3] reports a case of involvement of optic and olfactory nerves. This tends to disprove the theory that these tumours arise from the neurilemma (sheath of Schwann) because these nerves do not have such a sheath. Thomson[4] in his work says: "The meninges and membranes of the brain and cord are never affected."

The symptoms in a well developed case are in four groups: Tumours of the skin; tumours of the nerves; pigmentations of the skin; functional disturbances. Any one or more than one of these groups may be present in any case.

A very large number of cases are congenital, but one cannot agree with Bruns, who says they are always congenital. There are many examples in which the first tumour has appeared some years after birth. In some cases, while no cases are present at birth, there are congenital pigment flecks, and later the tumours appear. Not only may the tumours be congenital, but distinct evidence of the same condition existing in other members of the family is often seen.

Dr. Arthur Wright remembers a case which was in the General Hospital in 1916. The father suffered from multiple neurofibromatosis and died of sarcomatous degeneration of one of these tumours in his thigh, in which malignancy had developed. His two sons showed the same condition of multiple neurofibromatosis early in life.

The tumours arise from the endoneurium, and have leucocytic aggregations among the nerve fibrils. Garré has pointed out that the sarcomatous development differs in several important particulars from a primary sarcoma developing on previously normal nerves. Seventeen per cent of simple cases have developed sarcoma. The onset of malignancy in tumours that have existed for many years, may be determined by the removal of one of the tumours. while possessing a tendency to recur locally, it does not, with the rarest exceptions, give rise to any metastases, but on the other hand is followed by a generalized sarcomatosis in the remaining tumours, and although the malignancy of these tumours is less than that of a primary nerve sarcoma, the cases invariably end fatally. Even if an early and successful removal of the tumour, which has developed malignant features, be carried out, the patient is practically certain to sustain a fresh outbreak of sarcoma in other parts of his diseased nervous system,

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Note: I am indebted to Dr. Dickson for his help in diagnosis and the x-ray print, and to Dr. W. L. Robinson for the microphotographs.

GANGRENE OF THE LOWER EXTREMITIES COMPLICATING SCARLET FEVER

George E. Learmonth, B.A., M.D., C.M.

Calgary

This case is reported on account of the comparatively rare occurrence of gangrene during the course of scarlet fever.

The patient is a male child two years and eleven months of age, of Canadian parentage. He has never been strong and robust; has been nurtured with difficulty. The only acute illness to date, has been acute tonsillitis, in January, 1924. There is nothing of note in the family history relative to constitutional disease. Of interest is the fact that the father had just recovered from scarlet fever a few days prior to the onset of the disease in the child.

Present Illness.—Began on June 9th, 1924, as a typical attack of scarlet fever. On June 24th he developed acute otitis media (left) resulting in free purulent discharge from the ear. On June 28th there were evidences of acute nephritis with oedema of the eyelids and legs; the urine was well laden with albumin; lessened secretion of urine occurred two days later. On July 1st he was placed in the Isolation Hospital and the usual hospital treatment carried on; and mild diuretics and liquids were administered. Between July 3rd and 5th five injections into the right and left superior gluteal regions, 90 cc. in all, of convalescent serum from father's blood were given. All symptoms of nephritis subsided the sixth day after admission to hospital.

On July 11th a small patch of gangrene developed in the skin of the lower lateral third of the right thigh, and two days later a similar patch in the left thigh appeared. On July 18th, an hour after his return home from the hospital, there occurred sudden severe pain referred to the lower third of the left leg pos- (left), as well as the dorsum of the right foot The intense pain in both locations occurred at the same time and lasted for about two hours.

Typical moist gangrene followed in the wake of these symptoms and included all of the left foot and the lower third of the leg posteriorly (left) as well as the dorsum of the right foot and toes and a strip across the plantar surface, proximal to the toes. I could not tell at this time how much of the deeper parts was involved. Treatment consisted of washing these areas with Dakin's solution and the application of a paraffin mixture, such as is used in the treatment of burns.

FIG. I.—September 1st, 1924.

On August 9th the child was admitted to the General Hospital where all the superficial necrotic tissue possible was removed. There seemed to be no chance of saving the distal half of the left foot or any of the toes of the right foot as both these regions were deeply involved. No attempt was made to amputate, knowing the great risk of opening up healthy tissue, with the possibility of septicaemia following in scarlet fever cases. The distal portion of the left foot sloughed off at the tarso-metarsal joints. Nature formed excellent flaps

FIG. II.—September 8th, 1924.

FIG. III.—October 20th, 1924.

which united well. All the toes of the right foot separated at the metatarso-phalangeal articulations and as with the left foot prolific granulation tissue soon closed over the gaps left in the stump by the removal of the phalangeal bones. The granulating areas have been kept clean with 1.5 per cent solution (fresh) of mercurochrome painted over the various surfaces. Sterile vaseline was smeared over the under surfaces of the gauze dressing. The progress of the case during the first two months will be seen by the accompanying photographs.

The child is in excellent condition, and with well padded feet is able to walk, though as would be expected with a considerable degree of difficulty.

Discussion

In this case there is scarcely a doubt but that the *vis a tergo* was of an embolic nature, numerous emboli invading certain of the superficial and deep arteries of the legs and feet resulted in a blocking of the circulation in the more distant parts and a necrosis of all tissues not otherwise supplied by communicating vessels. The sudden onset like a bolt from the blue, accompanied by severe pain, followed by the appearance of a moist gangrene, in well defined areas of arterial distribution point to the embolic origin of the lesions.

A few words concerning the occurrence of gangrene in scarlet fever. In the majority of reported cases, and these are few, the skin in various regions has alone been affected, involving portions of the face, the extremities or the genitals. Gangrenous stomatitis (*noma*) is not of frequent occurrence during the course of scarlet fever, though an American writer[1] claims it is sometimes seen in epidemics of considerable size where scarlet fever is complicated by measles. C. B. Ker[2] in his classical work on infectious diseases says that he saw but two cases of cancrum oris in over twenty thousand cases of scarlet fever. Hare and Beardsley[3] refer to eleven cases of gangrene of the skin reported prior to 1909. Among these the face, the genitals and the extremities were involved. They remark that it may appear at the height of the disease or as late as one month after convalescence. Gangrene of the genitals (*noma valvae*) in young girls is usually attended by a high mortality. Undoubtedly the child who is malnourished and enfeebled prior to the onset of scarlet fever is more likely to develop gangrene than the child who has been healthy and vigorous.

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MUSCULAR DYSTROPHY

PERCY C. LESLIE, M.D., L.R.C.S.

Loose Leaves From a Chinese Clinic

Patient presented himself at our clinic complaining of weakness in arms and legs. He was a young man, twenty-nine years of age. About ten years ago he first noticed that he was losing strength in both his arms, and was unable to do ordinary farm work. An early symptom was an inability to raise his arms high enough to brush his hair. This condition gradually became worse, and wasting of the muscles of his arms above the elbows set in. Five years later the legs became similarly affected showing first loss of power, and later on wasting of the muscles above the knees. No preliminary hypertrophy was noticed either in the affected or non-affected groups of muscles.

Family History.—The patient states that his mother when about fifty years of age lost the power in her arms and could not do up her hair. Other parts of the body became gradually involved, and wasting in the affected muscles was noticed. The condition gradually became worse until death occurred about ten years after onset.

Personal Examination.—The patient stands with feet apart, and holds himself very erect; there is in fact a slight bending backwards so that a perpendicular drop from the most prominent point of the spine would fall well behind the sacrum. The shoulder, breast and back muscles are decidedly wasted. The acromion and coracoid processes are plainly distinguishable while the normal fulness of the deltoid is represented by a depression. The arm lies flat against the ribs and only with difficulty can the patient abduct the arms, his limitation of movement in this direction forming an angle with the perpendicular of about forty-five degrees. The forearm is well developed, and looks as if it were hypertrophied although this may be suggested by its pointed contrast to the wasted upper arm. The hand grasp is firm and the wrist movements normal. There is no suspicion of wrist drop.

The winging of the scapulae is well marked, and these wings can be moved freely in all directions. The presence of "loose shoulders" is readily demonstrated by placing the hands in the armpits and attempting to raise the patient. The shoulder muscles are so loose that the upper margin of the scapulae are pressed against the neck, while one receives the sensation that the patient is slipping through,—a symptom emphasized by Osler.

The muscles of the gluteal and thigh regions

show marked wasting with loss of power. The calf muscles are well developed and give the appearance of slight hypertrophy. The gait is swaying or rocking rather than the waddle that is described in books. He is unable to squat and on attempting to assume that posture he rests on his heels or collapses on the floor. On attempting to rise he places both hands on the floor, shoves himself up as far as possible, then places his hands on his knees and climbs up his own legs, a symptom that is pathognomonic of this disease. Before he stands erect he gives himself a final shove from the thighs and with difficulty assumes the erect posture. In his first effort to rise from the ground he does not turn over with face toward the ground as many patients, chiefly children, are known to do. In the patient's case this movement may follow when the muscles of the legs become more atrophied.

The face symptoms were interesting. The muscles are flaccid and the face expressionless. The lips protrude and suggest pouting. There is an appearance of atrophy on either side of the chin. The eyelids and lips are closed with some difficulty, and when closed there is little resistance when one applies fingers and separates lids or lips, indicating great lack of tone in both orbicularis muscles. Our attention was drawn to this characteristic symptom in Collier and Adie's excellent article on the dystrophies. The mind, speech and tactile senses are all normal. The patellar reflexes are, as would be expected from the involvement of the quadriceps extensor, decreased.

Collier and Adie divide the dystrophies into (1) pseudo-hypertrophic paralysis, and (2) other types of myopathy including (*a*) facio-scapulo-humeral type, (*b*) Erb's juvenile type, and (*c*) distal type, but they emphasize that all these are merely varieties of one disease, classified either according to the groups of muscles first affected, or the age when onset occurs. While the pseudo-hypertrophic type

is said to be most frequently seen in young boys, in the proportion of five to one, the other types affect both sexes without discrimination. Usually described as a disease of childhood, this and other cases we have seen have occurred in early adult life or in the adolescent period.

The condition is that of an atrophy, so far as is known, of muscular origin, although text books classify it under diseases of the nervous system. Hypertrophy may or may not occur as a preliminary symptom. If it does it may be either real or false, the enlargement in the latter case being due to excessive fat or connective tissue forming between muscle fibres. Selected groups of muscles are first affected but the condition will extend to other groups, including the voluntary muscles of the face, trunk and limbs, usually in the reverse order, until the patient if he lives long enough becomes a helpless and pitiable object.

The diagnosis is readily made in advanced cases. The wasting of the muscles of the shoulder and upper arm of the gluteal and thigh regions, the winged appearance of the scapulae, and the symptom of climbing up their own legs, leave no room for doubt.

In contrast with the wasting in the proximal muscles of these dystrophies, is the wasting of the distal muscles in progressive muscular atrophy, when the motor neurones are involved. Here it is usually the thumb muscles, followed by the interossei and the lumbricales that are first affected. The last case we had was that of a young man with these symptoms in both hands, accompanied by well marked difficulty in articulation, giving a clear picture of an associated bulbar paralysis.

UNUSUAL CASE OF INTESTINAL OBSTRUCTION DUE TO MECKEL'S DIVERTICULUM AND ACCOMPANIED BY DIFFUSE PERITONITIS

H. S. Dolan, M.D.

House Surgeon. From the Department of Surgery, Royal Victoria Hospital, Montreal

F. M., white male, age thirty years, No. 51983, on Feb. 14, 1924, while at work, began to be troubled with belching of gas and pain in the epigastric area. Pain was excruciating; occurred at irregular intervals and caused the abdomen to become tense, especially below the umbilicus. No vomiting. Pain ceased for two or three days but on Feb. 24, 1924, it recurred in same area. It was cramp-like in character. He was unable to work. He vomited two or three times during that day. Says his doctor told him that there was no elevation of temperature.

Admitted to hospital on Feb. 25, 1924, complaining of dull pain in the lower abdomen with slight exacerbations. No vomiting. General routine *physical examination* showed nothing abnormal. Temperature, pulse, respiration normal. Tongue and lips dry and coated.

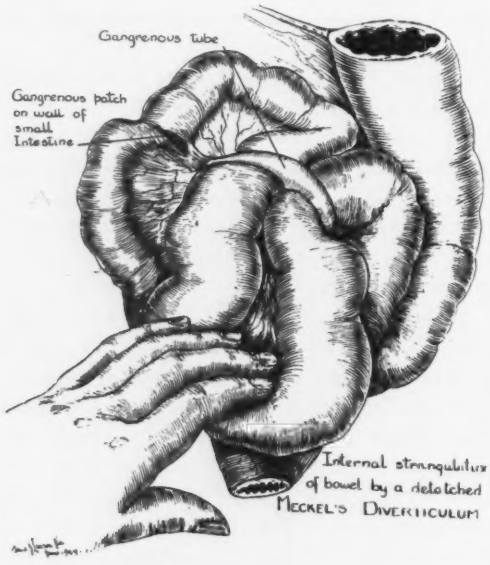
Abdomen soft throughout.—Slight tenderness in lower right quadrant. Slight fullness in area below umbilicus, more marked when pain became more severe.

Diagnosis.—Partial intestinal obstruction. A simple soap enema was very effectual; gas and liquid stool.

Feb. 26, 1924. Having severe periodic pains in lower abdomen. A tender, rounded, somewhat irregular mass, the size of a large fist, was palpable there. The mass became very tense during the cramp-like pains, which were now of frequent occurrence. Slight rigidity of both lower recti. No flatus or faeces passed. Immediate operation was decided upon.

Operation by Sir Henry Gray, Surgeon-in-Chief. Abdomen opened through long right paracentral incision; several ounces of grumous fluid (slightly fetid odour) escaped. Distended coils of bowel found all over abdomen, especially in right flank, covered by thick discoloured flakes of lymph. Caecum found just below the liver. The terminal six inches of ileum was adherent to the posterior abdominal wall in the right flank. As the peritoneum here was so inflamed and covered with purulent exudate, it was thought that there might be either an appendicitis or a perforation of the duodenum. Appendix found, tip free and much congested, the rest of it, "normal", buried beneath adhesions (Jackson's membrane). Appendix removed, much bleeding during separation of adhesions. No perforation. Caecum and lower ileum were distended. Several feet above the ileo-caecal junction were

found a few coils of bowel which had slipped beneath a gangrenous looking, thick (index-finger), tubular structure, about three inches long, which was attached to the under surface of mesentery by its ends. One attachment was close to the bowel, the other about two inches away, nearer the root of the mesentery. The bowel was easily manipulated from under the "band". Opposite the attachment of this band was a strip of gangrene of the wall of the bowel, about one quarter inch wide, which, during manipulation, ruptured. This gangrene reached from the mesenteric border for about one inch and ran parallel to the vessels of the bowel. The cause of the patch of gangrene was not very definite. It may have been due to the obliteration of the vessels of that part of the bowel by tension, but the gangrene was confined to one side only of the gut. The gangrenous area was stitched over without deforming the bowel.


Gangrenous tube
Gangrenous patch on wall of small Intestine
Internal strangulation of bowel by a detatched Meckel's Diverticulum

The constricting structure was found to be a hollow tube lined with mucous membrane resembling that of the small intestine. It must have been Meckel's diverticulum, which had been twisted off from its usual attachment and had become adherent at both ends to the mesentery. The attachments to the mesentery were apparently entirely fibrous. They were divided and ligated. The condition of the patient at this stage did not permit of any exhaustive examination with the object of finding the origin of the tubular piece of bowel. A rapid survey did not reveal any gross deformity of any part of the ileum except as already described. Abdominal cavity cleansed by dry swabbing. Because of the profuseness of the exudation which occurred during the cleansing process and the possibility of infection from the ruptured bowel, a double rubber tube was placed in the pelvis.

Pathological Report.—"Appendix normal. Exudative Diverticulitis (Meckel's)".

February 26 to March 26. Recovery stormy in early stages. Thereafter rapid convalescence. Considerable wound infection. There was profuse discharge of sero-purulent fluid through the drains for three days. March 26. Discharged. General condition good. No abdominal pains. Bowels regular. Wound not quite healed. No hernia.

"Follow Up". Oct. 12, 1924.

"Wound a long time healing. A long scar, varying from one inch to one half inch broad. No hernia, but at two points, one above the pubes, one higher up, a 'defect' in the muscle. General health good. No pain. No digestive disorders."

There are several points of interest in this case. (1) The cause of the strangulation. No record could be found of any case in which a Meckel's diverticulum, after being completely detached from its ordinary site, was the *fons et origo mali.* It is well known that Meckel's diverticulum is a fairly frequent cause of intestinal obstruction, but in all the cases hitherto recorded, it is depicted as springing from the antimesenteric aspect of the ileum and having its distal end fixed to the back of the umbilicus or some other part of the peritoneal membrane. In this case the tubular structure had no connection with the lumen of the ileum. There was an interval of one quarter inch between the wall of the bowel and the nearest fibrous attachment of the "diverticulum". Except for the patch of gangrene, the bowel there seemed normal. The fibrous attachments were not more than one quarter inch thick and were devoid of any visible vessels. To judge from the pathological report, gangrene had not occurred. It was difficult to imagine how such a large piece of what was virtually intestine received sufficient nourishment to keep it in-

tact. (2) The patch of gangrene on the intestinal wall must have been due to tension which obliterated the terminal "end" artery of only one side of the bowel. The other side of the bowel appeared perfectly normal. (3) The necessity for drainage of the peritoneal cavity. It was drained because fluid was being exuded apparently faster than absorption was likely to take place. The subsequent profuse discharge from the drains seemed to justify the precaution. In cases of peritonitis, after toilet of the affected parts of the peritoneal cavity has been done, a *slight* exudate of clear fluid has been found to be of very favourable import, and indicates that the cleansed peritoneal cavity can be closed safely without drainage[1].

REFERENCE

(1) Some problems of drainage, *Surg., Gyn., and Obst.*, Aug., 1924, p. 221.

The Symptomatology of Measles Modified by Late Serum Immunization.—The prophylactic values of convalescent measles serum was investigated by Joseph C. Regan, New York, in a series of measles cases. The convalescent serum used was obtained from five different patients, aged fourteen, eighteen, twenty, twenty-one and twenty-two years. A mixed serum from at least two or three of these donors was given at each immunization. This serum was obtained on the fifth, seventh and eighth day of convalescence. Four patients were injected during the invasion period. All of these patients received 10 cc. of serum by the intramuscular route, and one in addition 5 cc. intravenously. The serum seemed to have a slight effect on the course of the disease, especially when given intravenously, by modifying the severity; but it did not influence any of the characteristic symptoms. When serum was injected in the incubation stage the duration of the invasion was materially shortened in six patients. In two it was lacking entirely, in two it lasted only one day, and in two other patients only two days. In one child it was prolonged for six days, during the first four of which only a rise of temperature without any characteristic symptoms was present. In six patients, no coryza was noticed, while in eight of the nine remaining, it was very slight. In eight patients Koplik's spots were entirely lacking. Of the seven remaining children, they were decidedly abortive in two, and atypical in five. In six patients, there was practically no change in the appearance of the faucial mucosa and soft palate, while in nine others there were mild congestive changes. In only a few was a macular eruption noted on the soft palate. The eruption, while altered in some cases, remained more characteristic than any of the other cardinal symptoms. The highest temperature in five patients was between 101° and 102° F., and in five others between 102° and 103°. The constitutional symptoms were much milder than in nonimmunized children. Among the fifteen cases of modified measles studied, only one patient developed a complication that was an acute otitis media.—*Jour. Am. Med. Ass.*, Nov. 29, 1924.

Rickets as Influenced by Diet of Mother During Pregnancy and Lactation.—Judging from their experiments, Alfred F. Hess and Mildred Weinstock, New York, conclude that rickets cannot be prevented by improving the diet of the mother, previous to pregnancy, during pregnancy and throughout lactation, although it can be mitigated to a certain degree. Supplementing the diet of the mother for two generations also failed to render the young refractory. Infants were not protected by giving the mother cod liver oil during the last two months of pregnancy. On the other hand, the fact that premature infants are markedly susceptible to rickets shows that prenatal nutrition does play a rôle. A consideration of the experimental evidence, of clinical tests, of the susceptibility of bottle-fed compared to breast-fed babies, and the striking seasonal incidence leads to the conclusion that rickets is mainly of postnatal origin. Although its incidence and severity may be influenced by improving the nutrition of the mother, our main efforts should be directed toward improving the environment and nutrition of the infant. Until these postnatal factors are corrected, we cannot hope to prevent rickets.—*Jour. Am. Med. Ass.*, Nov. 15, 1924.

Retrospect

RESUME OF BRITISH OPINION ON THE ACTION OF ALCOHOL IN MEDICINE AND ITS USE AS A BEVERAGE

It is important that all sides of this much discussed problem as to whether alcohol has any value in therapeutics and whether its use should be altogether prohibited as a beverage, or only permitted with many limitations, should be placed as fully as possible before the Canadian profession. We therefore take advantage of the fact that *The Practitioner* has devoted a recent number entirely to a series of papers by well-known medical authorities on its action and usefulness when employed as a therapeutic agent and of its influence on the health and well being of the community when it is permitted to be used as a beverage and we herewith present a résumé of the opinions expressed. The Editor of *The Practitioner* in his foreword states that he regards the subject as one of great importance to civilized humanity, and as a national problem affecting every class in the community. He adds that the only testimony that can be of real value is that rendered by qualified and scientific observers. The Editor also calls attention in his foreword to the habit of drinking cocktails before meals, which certainly was not recognized as an English custom a few years ago. A change however has come over society, and this phase of drinking must be ranked as among the most reprehensible forms of alcoholic abuse. The belief that cocktails create an appetite for food is erroneous, and their frequent consumption has a most serious effect upon the health.

The first article in the series is on "Alcohol in Medicine" and is written by Sir Humphrey Rolleston, President of the Royal College of Physicians, of London. This writer at the outset of his article, referring to the therapeutic use of alcohol, states that alcohol should always be regarded in the light of a drug, the pros and cons for the administration of which demand careful thought. While in some measuse it undoubtedly may act as a food, the indications for its use should be scrutinized as rigourously as those for any other substance in the pharmacopoeia. Its use may be beneficial, useless, or actually harmful, according to the amount and manner in which it is employed. As in health, so in disease, it is the indiscriminate and excessive employment that has given use to the view that alcohol is of little value and may often do harm. The majority of physiological investigations undoubtedly tend to make it appear that alcohol has a depressant rather than a stimulating action. The effect obtained is influenced largely by the dose and conditions under which it is given. Notwithstanding these experiments, clinical observations by innumerable medical men over long ages have brought in a verdict favourable on the whole to the use of alcohol in disease; and it is well, to bear in mind that there are two sides to a shield, and that empirical results are deserving of consideration.

The main value of alcohol is in an emergency, and as a more or less temporary measure. It certainly appears to have definite value in the crisis of an attack of pneumonia, and it is not infrequently useful as a sedative to induce sleep. There is also *prima facie* justification for its use as a food in cases in which ordinary nourishment cannot be satisfactorily utilized. It must, however, always be remembered that alcohol circulating in the blood in full doses and over long periods, can produce toxic degeneration in the cells of the tissues. Its continuous use in prolonged fevers is for this reason open to objection. As it is the only food material free from the special characters of the proteins which is not directly transformed in the body into sugar or fatty acids, alcohol has been employed in the treatment of diabetes, mellitus. Joslin of Boston however, a well known authority, in a recent discussion on the subject says: "that although theoretically alcohol might appear to be useful in diabetes patients practically are better without it," and he believes that one of the reasons why diabetics suffer less from neuritis in America than in some other countries is due to the smaller amount of alcohol consumed.

As a gastric tonic and adjuvant to digestion in cases of convalescence from acute disease

and in conditions where the secretory and motor activities of the stomach are impaired, the use of a small amount of alcohol in the form of brandy or wine may make all the difference between distaste for meals and painful digestion on the one hand, and the ability both to eat and assimilate food on the other. The good effect is not due solely to the alcohol but in part also to the contained ethers. A physician, however, must be careful and bear in mind that a latent craving for alcohol or a psychosis which otherwise would not have developed may be activated by the medicinal administration of alcohol.

In gastric carcinoma alcohol, though it does not increase secretion, does good by diminishing pain, fermentation and eructations, and by creating a feeling of well-being. Its use in these conditions being to some extent the practice of euthanasia. In ulcer, hyperchloridia, and hypertonus of the stomach, alcohol is prone to exaggerate these disorders. In sudden heart failure and threatened syncope the action of concentrated alcohol on the gastric mucous membrane may rapidly and powerfully stimulate the heart, but for this purpose ether is equally effective.

Alcoholic drinks relieve worry and counteract restlessness, and so may be of definite value in some cases of sleeplessness. Alcohol may be of value also in cases of inoperable malignant disease and in other hopeless conditions. In these patients a careful use of alcohol is found to give comfort and "soothe the last lap of life's troublous transit." It is often a good plan to give small meals that will not distend the stomach, and to give at short intervals diluted spirits or wines according to the patient's fancy.

Sir Arthur Newsholme in his contribution to the series takes up *the social aspects of this problem*, and writes that the evidence of the evil of alcoholism as a beverage is still overwhelming. The effect of alcohol on character is always in the direction of reducing the efficiency of the drinker's power of inhibition against antisocial conduct. He quotes Sullivan who in his essay on "The Drink problems of to-day" writes: "Considering the several categories of serious delinquency we have found that alcoholic intoxication is answerable for about 60 per cent of the indictable crimes of violence, and for a rather higher proportion of minor offences of the same class. It is probable also that it is the cause of nearly half the crimes of lust. The Royal Commission on Venereal Diseases in its report states that 'Abundant evidence was given as to the intimate relation between alcohol and venereal disease; decrease in the use of alcohol will be an important factor in diminishing the prevalence of venereal disease'."

Under the head of "Economic losses due to alcohol" Sir Arthur Newsholme states that in 1923 in Great Britain, 930 million gallons of beer were consumed as contrasted with the 800 million gallons of milk drunk during the same period. The amount spent on drink during the year was equal to the total interest on the national debt, and if used for other and better purposes would have paid the rental on every house, farm, shop, estate and factory in Great Britain. Therefore he writes: "That if the drink problem is solved the housing problem will also be." The evil, however, is decreasing in Great Britain, and between 1899 and 1922 the per capita consumption of beer in the United Kingdom declined from 32.53 to 15.80 gallons, and convictions for drunkenness in England and Wales decreased from 161,407 in 1910, to 76,347 in 1922. Attention is also drawn to the high mortality amongst those who are engaged in the manufacture and retailing of alcoholic drinks as compared with the same number of men of the same age otherwise occupied. Sir Arthur also states that through its influence in demoralizing character and in producing poverty that excessive alcoholic indulgence increases infantile mortality.

In his opinion medical guidance for the public should be along the following lines: first, the drinking of alcohol between meals should be forbidden and, the evils arising from such a habit should be pointed out to every family; second, a strong medical opinion on the evil resulting from overindulgence in spirits and in the stronger wines and beers should be given to every householder; third, the utmost care should be exercised by members of the profession to prevent the possibility of any temporary prescription of alcohol becoming the starting point of an alcoholic habit.

Professor Starling contributes a paper on the "*Physiological action of alcohol*". "Alcohol,"

he writes, "is extremely diffusible and passes with ease through animal membranes. When taken in strong solution on an empty stomach the whole of it may be absorbed within half an hour. When given with food or much diluted, absorption takes place more slowly, but is generally complete in two and a half hours; the method of its administration determines the rate of its absorption and therefore the maximum concentration in the blood. The rate of disappearance from the blood is about the same and is equivalent to about 10 cc. per hour. A certain amount is excreted by the breath and by the kidneys, but the amount so lost is comparatively small. Its disappearance from the blood is undoubtedly due to oxidation which can only take place with the evolution of a certain amount of energy in the form of heat. Experiments by Atwater and Benedict indicated that when an individual took 72 cc. of absolute alcohol in a day, being the amount contained in a bottle of claret, 96 per cent of the alcohol underwent oxidation provided the doses were spaced evenly over the day and well diluted. They also showed that alcohol could replace as a source of energy, fat, carbohydrate or protein, and that when work was undertaken the total metabolism was the same as in experiments without alcohol. The work, however, must be of the simplest character. Every mountaineer is familiar with the deleterious effects of even small doses of alcohol on his power of climbing. Alcohol, owing to its influence on the central nervous system, also interferes with the finer co-ordination of the muscles, and thus lessens the amount of work possible demanding such co-ordination."

Sir James Purves Stewart discusses the question of the "Influence of alcohol on the nervous system", and describes the various forms of intoxication with poisonous effects on the nerve cells which may occur. It is worthy of note that in contrast with experience in Canada and the United States, Purves Stewart states that he is not aware of any case in England of acute optic atrophy and permanent blindness following upon the drinking of wood alcohol.

Alcohol in its relation to insanity is discussed by Sir Frederick Mott. He points out that he was able to prove from examination of those admitted to the London asylums that instead of alcohol *per se* being the cause of insanity in the great majority of admissions it really was in relatively few. Furthermore it has often been stated that alcohol is an important cause of insanity, meaning thereby the ordinary psychoses which go to make up the great mass of certifiable lunacy; in reality it is highly improbable that alcohol plays any direct part in the causation of these affections. This negative conclusion has been solidly established by pathological examinations by Sir Frederick Mott who has shown that the morbid conditions specifically associated with alcoholic intemperance are much rarer in asylum patients than in ordinary hospital cases.

In an interesting article by Dr. T. H. C. Stevenson of the General Register Office, Somerset House, it is stated that it is almost impossible to arrive at a true statement of the number of deaths due directly and indirectly to alcohol. He heads his paper with the quotation from Louis Stevenson, "Drink and the devil had done for the rest". Alcohol undoubtedly contributes to innumerable deaths for which it is not immediately and primarily responsible, and which are rightly assigned to other causes. It would seem impossible to give the devil his due in the partnership referred to in the familiar line quoted above. Insurance data, however, are on record for abstainers and non-abstainers from alcohol, by which the relative mortality at various ages of these two classes may be compared. The feature of the abstainers' mortality rates is the definite reduction which takes place in them after early manhood as compared with the mortality in non-abstainers throughout all the working years of life. Taking the mortality of non-abstainers as that of 100, that of male abstainers vary from fifty-five to seventy. Professor Pearl of Johns Hopkins University takes exception to insurance data in general on two main grounds. First, insurance societies he says have no means of knowing with certainty the habits of those who are insured, and secondly those insured are likely to underestimate their use of alcohol. Professor Pearly in an article quoted in this *Journal* (Editorial, September, 1924) finds that moderate drinkers, persons using alcohol in any form but in small amounts at any one time live somewhat longer than abstainers, while heavy drinkers have a markedly higher mortality than moderate

drinkers at all ages. The tendency in discussions of this question has been to assume that any differences in mortality shown to exist between abstainers and non-abstainers are due to differences in their habits with regard to alcohol. Stevenson is of the opinion that it ought not to be assumed that but for their habits regarding alcohol the expectation of life of the abstainers and the non-abstainers compared would age for age be equal. He thinks that total abstainers include amongst their ranks a larger proportion of enthusiasts commonly referred to as cranks, than do the non-abstainers. Abstainers he regards as a restless, strenuous, active, and sometimes a contentious lot; perhaps especially so, in years gone by. Men who took up an unpopular stand in social life were necessarily of that stamp of mind. It was the quiet, equable steady man who allowed nothing to worry him who was the moderate non-abstainer. The teetotaller in many instances belonged to the class of strenuous, conscientious, active, fighting, worrying men. Have such persons a normal expectation of life? It would appear that on the one hand we have the combination of moderate drink and an easy going life, and on the other of teetotalism and life strain of the crank, with the result that the statistical measurement of the effect of alcohol upon humanity seems to be impossible.

Sir Arthur Newsholme asks the question "To the adoption of what measures should we look for improvement in present conditions?" and answers it as follows. "Undoubtedly to a higher educational enlightenment and to a higher moral standard. The history of alcoholic restriction imposed during the war also leaves no doubt that legal restrictions on the price of drink and on the hours of sale markedly influence the amount of alcohol consumed, and as a consequence the prevalence of disease and the number of social offences due to intemperance. He emphasizes strongly the great value of the restriction of the number of public houses in a town, and states that if they could be closed for six months a large proportion of the population now living under conditions of housing inimical to health and to self respect would be greatly lessened and an immense improvement in the health and efficiency of workmen in all ranks would follow. A. D. B.

A. M.

Secondary Closure of Tuberculous Nephrectomy Wounds.—Because of the breaking down and slow healing of wounds following removal of an abscessed tuberculous kidney, Charles Y. Bidgood, Baltimore, studied the results, in two cases, of secondary suture of these wounds. It was not possible to avoid leaving a cavity under the superficial tissues, since the oblique muscles could not be approximated. The cavities were irrigated with antiseptic solutions, diminished rapidly in size, and on the discharge of the patients had almost disappeared. In both cases the anterior angle of the wound spontaneously established a drainage tract, and the posterior angle showed great tendency to heal. This would indicate that the anterior angle is the proper site of drainage. The results in these cases have more than vindicated the operation. By this procedure a large, gaping, indolent wound that incapacitated the patient has been converted into a healed wound except for two small sinus tracts, which were becoming progressively smaller during the last days of the patient's stay in the hospital. The prognosis in regard to healing of the granulating wounds, without operation, is ultimately good, but months would elapse before it would be complete, and by this procedure one is able to save the patient a long, tedious convalescence.—*Jour. Am. Med. Ass.*, Nov. 15, 1924.

Pure Gas-Oxygen Anesthesia for Ear, Nose and Throat Surgery.—Gas-oxygen anesthesia is favoured by E. I. McKesson, Toledo, Ohio, for otorhinolaryngologic surgery. He claims that it shortens the coagulation time of the blood; that under pressure, it makes general narcosis safe for patients with obstructive complications, such as quinsy or tumours: and that it discourages aspiration of pus, blood and infectious material.—*Jour. Am. Med. Ass.*, Nov. 8, 1924.

Editorial

RESEARCHES IN SCARLET FEVER

RECENT progress in research into the etiology, specific prevention and serum treatment of scarlet fever has already received editorial consideration, but the publication in the current number of a paper by the late Dr. W. Ray Hodge of the Connaught Laboratories, University of Toronto, is a further contribution to knowledge in this field. The tragic death of this able young clinician and laboratory worker in the very midst of labours in the new fields opened to scientific investigators as a result of the work of the Dicks, has been a great loss to scientific medicine in Canada.

Early last summer Hodge visited the Dicks and Dochez and in June, 1924, in the Research Division of the Connaught Laboratories he began a series of investigations in collaboration with several other workers in the same Laboratories. He also was made responsible for the large scale production of scarlet fever streptococcus filtrate (toxin) for both testing susceptibility (the Dick test) and for the active immunization of susceptible persons as well as for the production of antitoxin in horses. In all of this work, into which he had thrown himself with characteristic energy and zeal, he had, with his collaborators, made such substantial progress that toxin for testing and active immunization is available in adequate quantities.

The influence of various factors on toxin production was also being investigated and considerable information bearing upon this important point had been gleaned. The publication of several papers was being planned at the time of his death.

Hodge and his collaborators have definitely established that the conclusions arrived at by the Dicks are entirely justified and every feature of their work has been repeated with the exception of the experimental production of scarlet fever in human beings. Only his untimely death has prevented his adding to his enviable reputation as an admirable medical investigator, through the publication of results, a brief reference to which is made herein. An obituary notice appears elsewhere in this number of the *Journal*.

J. G. FITZGERALD

HYPERTELORISM WITH REMARKS UPON ANOMALIES IN GENERAL

IN the fourth Sir John Struthers' lecture, delivered in the Hall of the Royal College of Surgeons of Edinburgh on February 1st., 1924, and published in the *Edinburgh Medical Journal* for October, 1924, Mr. D. M. Greig, F.R.C.S.E., Conservator of the Museum of the Royal College of Surgeons of Edinburgh, describes, under the above appellation, a hitherto unrecognized gross cranio-facial deformation.

Before proceeding further we may digress to mention briefly our views as to the attitude of our profession at large, and of the general practitioner in particular, towards such gross abnormalities. At the present time we can do very little for these cases, either in the way of cure or of prevention, but whatever may be attempted in the coming years in the way of devising therapeutic measures applicable to such deformities, prevention is surely better than cure, and happily the progress of modern knowledge in the field of teratology seems to afford some grounds for entertaining

the humane anticipation that the day will come when such unfortunate sufferers will not even enter upon their miserable existence. This is an ideal, and may never be fully realized; nevertheless it is our duty to strive to approximate thereto as closely as may be. This will be possible only upon the acquisition of a working comprehension of the underlying factors or "laws" which by their operation produce these anomalies; and the elucidation of these laws—*i.e.*, the discovery of the answer to the age-long question: *Why* do such anomalies occur? is the immediate problem which faces our profession, relative to such cases.

Medical literature abounds with descriptions of anomalies, which make for the most part somewhat dull reading, unless our interest therein has been definitely stimulated. Moreover, it would now appear somewhat unlikely that the operative etiological factors—*i.e.*, the answer to the question: *Why* do such conditions occur?—will be discovered by a study of purely descriptive accounts of individual cases, even although these descriptions be accompanied by convincing suggestions as to *how* the conditions were brought about. At present we are looking to the experimental teratologists for the light. Descriptive records are of great value, however, for amongst other things they constitute indispensable material for testing the validity of suggested explanations of the causation of anomalies, arrived at as the result of experimental work upon animals, for any theory to be valid must explain satisfactorily every known case falling into the category to which the theory in question professes to apply. To this end it is desirable that anomalies such as hypertelorism should be recorded whenever feasible, and Mr. Greig's lecture, in addition to defining the condition of hypertelorism, furnishes a stimulus to others who may meet with such cases to place them on record.

On all sides we hear it stated that it is impossible to carry on medical investigations outside elaborately equipped institutions. But, as Sir Arthur Keith points out, "It was Hugh Owen Thomas's great merit to have proved that a busy general practitioner can, by purely clinical methods, win for himself a permanent place among the benefactors of Medicine," and surely a moment's consideration of the life and work of Sir James Mackenzie cannot fail to furnish further evidence of this great truth. That these gross anomalies constitute a field of investigation for the general practitioner appears clear when we remember that not only can he observe and record the actual condition of the patient, and the progress of that condition, but, what is scarcely less important, he can, in many cases at any rate, from his *personal* knowledge of the patient's family and other matters, bring to bear upon the analysis of the case a fund of information which could never be obtained in any institution by the usual process of questioning the patient or perhaps one or two relatives, concerning the reliability of whose statements there is frequently not a little doubt. This aspect of the case is well expressed in the following words of Professor Arthur Thomson of Oxford although they refer to a somewhat different matter. Speaking of the medical man he says: "He is the constant witness of the ever varying influence of nature, operative from birth through adolescence to old age and death. The examination of his patients provides him with opportunities for studying their bodily characters and peculiarities in a manner not available to others; whilst his observations on disease, nutrition, food, soil and climate enable him to form an especially valuable estimate of the influence of environment on the individual and on the community. In matters of heredity, too, his experience often ranges through three and sometimes four generations."

Mr. Greig's account of hypertelorism is based upon the examination of two well-marked cases during life, one more pronounced than the other, and of the skull of the former, which he was fortunate enough to obtain. He states that there is little doubt that in its fully-developed state hypertelorism is a rare deformity, but minor manifestations of

it are frequently to be observed," and he points out that hitherto it has been confounded with oxycephaly. It is, however, a definite clinical entity, and calls for differential diagnosis.

A satisfactory mental picture of the condition can scarcely be acquired without studying Mr. Greig's detailed descriptions and his photographs, but the main features may be mentioned. They are four in number. (1) The eyes are situated further laterally than normal, giving increased inter-ocular distance—this has given the condition its name; (2) correlated with the increased inter-ocular distance, the bridge of the nose is unduly broad; (3) the lower jaw and lip project forwards; (4) the mentality is defective.

Both these cases described were females, and both suffered from tuberculous cervical adenitis. The more pronounced case died at the age of twenty-two from pulmonary tuberculosis, while the slighter case died at the age of seventeen from tuberculous cervical spinal caries with diplegia. Thus there seems to be some association with tuberculosis, but we must remember that but two cases are described. The family histories are not illuminating.

Mr. Greig ascribes the condition to a developmental defect in the sphenoidal region of the chondro-cranium, "and perhaps in the mesoblastic tissue in which the chondro-cranium is laid down." This is *how* the anomaly is brought about. The author's view as to *why* it occurs appears to be contained in the following phrase:"..... A result of that hereditary want of balance in development, which in families marked by Nature for extinction, brings forth the physically and mentally maimed and defective individuals whom we stigmatise as 'degenerates'." This simply informs us that hypertelorism has done no more than its fellow-anomalies to elucidate the underlying causes which produce such conditions. It would have been highly interesting had Mr. Greig considered hypertelorism in the light of the experimental results obtained by Professor Stockard, for example, but doubtless the time is not yet ripe for such a procedure. We think it likely, however, that the next great step will be the correlation of clinical and experimental teratology, and we feel that this is the immediate goal before teratologists.

Mr. Greig's lecture is not only a stimulus to the further recording of such anomalies—it is also a model. His beautifully systematic description of the skull of Mary Macdougal and his masterly analysis of the condition are a source of delight to the reader who appreciates scientific work and thinking of a high order, and they call for emulation on the part of those describing such specimens.

The late Mr. A. D. Darbishire said that "Earnestness is not a sufficient qualification for authorship." The authorship of Mr. Greig, however, possesses so many admirable qualities in addition to earnestness that it may be claimed as an example of a high type of scholarship which should invariably adorn the pages of medical literature. I. MACLAREN THOMPSON

THE VALUE OF INDUSTRIAL HEALTH SERVICE

ACCORDING to Professor Irving Fisher of Yale University, the economic value to the state of an industrial life at the age of thirty-one may be conservatively placed at $8,000.00. The net annual waste due to neglect of the health of industrial workers based upon the loss from preventible disease alone has been estimated to amount to more than a billion dollars in the United States, and more and more pressing becomes the obligation of those who are at the head of industry to assist every effort among their employees which may tend toward the conservation of health and the prevention of disease. A recent writer has also emphasized the importance of the physical examination of

employees, not only to secure and maintain their own health at a maximum but also to determine the character of the work for which each employee is best suited. Such an examination will lead to the discovery of defects or disease which might make an employee specially prone to accidents or liable to cause accidents to others, and to the discovery of applicants whose employment in any capacity would constitute a source of danger to themselves, to their fellow workers, or to property.

The great value of such medical examinations is demonstrated by the marked reduction in the number of minor injuries, and the greatly lessened loss of time attributable to disease. The general consensus of opinion among those industrial executives who have had the longest and largest experience with health service in their industrial works is that the returns which can actually be measured in terms of dollars and cents greatly exceed the expenditure for carrying out such service. Furthermore, the returns which cannot be measured in terms of dollars and cents are at least as great as those permitting of a more precise valuation.

INDUSTRIAL MEDICINE

THE conspicuous changes which have taken place in medicine in the last two decades have occurred for the greater part in two fields, first in the field of diagnosis, and second in the field of prevention, and in both these fields the development in industrial medicine has been very marked. Indeed in the first field, namely the diagnosis of industrial intoxications, the most astonishing progress is being made. Each year adds to the number of industrial intoxications which can be recognized and differentiated. As in other cases of development in the refinement of diagnosis the great difficulty is how to make this information part and parcel of the everyday working knowledge of the practitioner, so that disease may be recognized in its early stages and steps taken for its prevention. It was therefore a step in the right direction when the Committee on Industrial Medicine of the Ontario Medical Association last year in one of the small bulletins issued to the profession laid down indications for the diagnosis of lead poisoning in its very early stages. We can all remember when as students lead poisoning was discussed, one of the symptoms referred to and on which a great deal of emphasis was laid was wrist-drop. We now recognize that wrist-drop is an exceedingly late manifestation of the disease; that at the time that it develops, the patient has been so seriously poisoned that a long period of treatment is necessary before he can resume his previous avocation. Lead poisoning can now be recognized with assurance at a much earlier stage, and there is little excuse for the attitude of a medical referee who recently refused to consider a case as one of lead poisoning because the patient failed to show wrist-drop.

Chronic benzol poisoning can now also be recognized at an early stage. Given a history of repeated exposure to benzol fumes over a long time and add thereto some feeling of weakness and lassitude, and a white blood count of 5,000 or under, a diagnosis of benzol poisoning may fairly be made. Nowhere in Canada at the present moment have we exact information of the incidence of such industrial poisonings. Very frequently when the employee feels that his work is affecting him deleteriously he leaves, and the damage he has already received only becomes obvious at a much later date. When the Massachusetts General Hospital started its industrial clinic prominent physicians and even members of the

staff were of the belief that there was no need for such a clinic, inasmuch as there was little industrial disease. The ordinary physician in Boston and even members of the hospital staff hardly looked to the occupation of their patient to throw any light upon obscure symptoms. An experiment lasting five years has led to a complete change in viewpoint. It is recognized that there exists a great deal of industrial intoxication, and that the present and past occupation of patients must continuously be taken into consideration if an accurate clinical diagnosis is to be made. Canada is not as yet highly industrialized but there is little doubt that in the larger places more attention could with advantage be given to this problem.

In the field of prevention also great strides have been made, but these have largely taken the form of the installation in workshops of draught systems by which fumes and dust are removed. Three groups of persons are interested in the early diagnosis of industrial intoxication, the employee because of the effect on his health at the time and subsequently; secondly the employer who may be affected inversely by having to pay compensation, or by an undue labour turnover, and by great loss of time by his employees; thirdly the physician who is on call or employed at the works. He has difficulty in making a diagnosis and in treatment. Were he to visit and study the processes in use in the works his task would be easier.

A physician can save the employer in compensation and labour; he can save the employee's health and aid him in getting compensation, and incidentally he could show that his services were sufficiently valuable to entitle him to adequate remuneration. But he must devote sufficient time and attention to his duties to be thoroughly familiar with the personnel and the active conditions under which they work. He could also in many cases contribute to our knowledge of the points essential for the diagnosis of industrial intoxications.

V. E. HENDERSON

ON THE DISPOSITION OF ETHER IN THE BODY

IN a series of papers Haggard[1] presents the results of his studies on the absorption, distribution and elimination of ethyl ether in the body, and points out that the mechanism involved is applicable as well to any gas or vapour which is not changed at any point throughout its course.

The investigation was made possible through the development by Haggard[2] of a method for determining ether in blood or air, which depends upon the reaction between ether and iodine pentoxide at 200 °C. when iodine is liberated, collected, absorbed in a potassium iodide solution and titrated with thiosulphate, using starch as an indicator.

The distribution of ether between air and blood at body temperature shows that blood contains 14.9 times as much ether per unit volume as does an equal volume of air. This has been confirmed by Shaffer and Ronzoni[3]. Ether is excreted unchanged and approximately ninety per cent. can be recovered in the expired air. A very small amount was found in the urine and this is proportional to the percentage of ether in the blood during narcosis, supporting the fact that the solubility of ether in blood and water is practically the same. A very small portion of ether is excreted through the exposed serous surfaces as has been shown by Henderson and Haggard[4], when air incarcerated in the abdominal cavity during anæsthesia rapidly assumed an ether partial pressure equal to that in the alveolar air.

When ether vapour of a given and uniform concentration is inhaled there will soon be established an equilibrium between the ether content of the alveolar

air and that of the blood. Although for practical purposes the distribution of ether is fairly consistent throughout the whole body, yet fatty tissues hold more than others. Some tissues having a more abundant blood supply than others, as brain and kidney, become saturated more rapidly.

Haggard further shows that the concentration of an anæsthetic in the central nervous system, and not that in the body as a whole, is the determining factor in narcosis. Again, the blood supply to the brain is greater than that to any other part, as shown by the rapidity with which the ether content of the blood of the internal jugular vein reaches that of arterial blood, and the tissues of the central nervous system very quickly assume a saturation at the tension of the ether in the arterial blood. When ether is absorbed, it is distributed between a smaller part, the brain; and a greater part, the rest of the body; on the former it has its strange physiological action; on the latter, the effect is not nearly so specific; here, however, because of the larger capacity there is a delay in induction and in recovery.

Further experimental data are presented which show that when the body is in complete equilibrium with a given concentration of inhaled ether then the anæsthetic vapour of the inspired air is identical with that of the expired air; at the same time the ether contents of blood from the right side of the heart and of the arterial blood are equal. In any condition short of equilibrium venous blood from any other source has no precise significance as to the degree of saturation of the body as a whole. The ether content of the blood from the internal jugular vein is an index of the degree of saturation or concentration in the central nervous system, upon which depends the degree of narcosis.

In analyzing the mechanism of absorption and elimination mathematical expressions are presented which give rise to a curve approximating that of Boycott, Damant and Haldane[5] for the absorption of nitrogen or any gas or vapour which is taken up and given off unchanged. The rate at which ether is absorbed under comparable conditions of respiration and circulation is in direct proportion to the concentration inhaled. The rate at which ether is absorbed or eliminated varies with the volume of air breathed and this is occasioned by the high solubility coefficient of ether. Increased respiration should, therefore, accelerate both the induction of narcosis as well as the elimination of the anæsthetic agent. Prolonged induction of ether anæsthesia is undesirable. By increasing the concentration of ether the induction of anæsthesia can be greatly shortened, but the inhalation of high concentrations of ether results in an even more than proportionately great pulmonary irritation. Rapid induction of anæsthesia can be brought about and pulmonary irritation reduced to a minimum by the use of low concentrations of ether, but with an increased volume of breathing induced by dilute carbon dioxide. Experimentally, this was shown to be so by Henderson, Haggard and Coburn[6] through the administration of carbon dioxide to stimulate respiratory activity. Clinically, carbon dioxide has been used by White[7] in forty cases to whom ether had been given for various surgical procedures. He reports that recovery is from three to five times as rapid; nausea and vomiting are lessened; where there is depression of the respiratory centre by injury or pressure, stimulation becomes evident; hypocapnœa occurring during anæsthesia is promptly relieved; and acidosis is not enhanced by its administration. It is to be hoped that these desirable effects will be made use of in the practice of anæsthesia.

WESLEY BOURNE

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THE IMMEDIATE CAUSE OF THE ACIDOSIS OF ANAESTHESIA

DURING the last half dozen years there has been considerable interest in the investigation of the hydrogen ion concentration of the blood and tissues, of the means and agents producing changes in these concentrations, and of the effect of such changes on body processes.

Ordinarily the hydrogen ion concentration of the blood is quite close to that of pure water. Now water is neutral as far as acidity and alkalinity are concerned, hence for every hydrogen ion present there must also be a hydroxyl ion. This is apparent from the simple equation

$$H_2O = H \text{ ions} + OH \text{ ions}$$

Actually blood is slightly alkaline and therefore contains a somewhat greater proportion of OH ions than of H ions. If an acid is dissolved in water the H and OH ions are no longer present in equal numbers but the H ions predominate since they are formed from the acid according to the equation

$$HCl = H \text{ ions} + Cl \text{ ions.}$$

In the acidotic stage of diabetes there is a very decided increase in the hydrogen ion content of the blood because of the formation of acid compounds, the so-called acetone bodies; but it is with the increase in hydrogen ion concentration which occurs in general anesthesia that this communication is concerned.

The cause of the increased acidity of the blood in anaesthesia—or, more properly, the cause of the decreased alkalinity, since the point is rarely reached where there are actually more hydrogen ions than hydroxyl ions present—has been a matter of considerable interest. It is desirable to know, for example, whether this change is due to the formation of acetone bodies as in the case of diabetic acidosis or to some other acid or acids. That it is not a question of acetone bodies appears to have been decided by the work of Leake, Leake and Köhler[1] who were unable to discover any significant change in the content of acetone bodies in the blood during anaesthesia. This differentiated the nature of the acidosis from that of diabetes but it did not suggest the nature of the acid involved.

Two papers[2,3] have appeared on this subject within the last year, which approach a solution of the problem. The results of one of them indicate that as a direct consequence of ether, chloroform and nitrous oxide narcosis phosphoric acid is liberated in the skeletal muscles and presumably neutralizes alkali on its passage into the blood. This is indicated by the fact that while the phosphoric acid content of the muscles decreases the sodium and potassium contents do not change; hence the loss of phosphoric acid is not to be explained by the loss of phosphoric acid compounds such as sodium and potassium phosphates from the muscles but of phosphoric acid itself. The acid which leaves the muscles is not excreted immediately. Examination of the liver shows that it accumulates there and it is only subsequent to the anesthesia that it is excreted or partially excreted and partially returned to the muscles. Bourne and Stehle have shown that the phosphoric acid excretion in human beings[4] following anaesthesia is decidedly increased.

In the second paper referred to, changes in the lactic acid content of the blood during anesthesia have been investigated and significant increases noted. Since phosphates and carbohydrates are believed to be intimately associated in muscular metabolism and since lactic acid is derivable from carbohydrates it may be that the liberation of phosphoric acid and lactic acids from the muscles is due to the same general

action of the anesthetics on the muscle cells.

R. L. STEHLE

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HEART DISEASE AND ITS PREVENTION

AT the last meeting of the British Medical Association for the Advancement of Science Sir David Bruce emphasized strongly the altruistic work that medical science was doing in the way of prevention of disease. The figures showing the wonderful results accomplished in this direction during the past fifty years were given in our last issue in the editorial "Success in Medicine" and are certainly most encouraging. The reduction of the annual death rate by nearly fifty per cent and the practical elimination of several diseases from the mortality table is a result of which the medical profession may be proud. Heart disease unfortunately is a notable exception and both in America and in Great Britain exacts annually the largest number of deaths and effects the greatest amount of disablement, besides shortening by half the span of life of its victims. At the present as stated by Dr. Haven Emerson in the "Survey Graphic" of November 1st 1924, approximately one per cent of school children have already acquired a definite cardiac disorder while three per cent of adults of working age have to reckon with the disease as a definite disability. The magnitude and importance of this problem has been too long overlooked on both continents. The many difficulties which all attempts at its prevention have to face have thus far discouraged the profession, and public attention has been concentrated on the other great destroyers of public health, cancer, tuberculosis and venereal disease. At the meeting of the British Medical Association in Portsmouth in 1923, special attention was given to this subject, and a subcommittee was appointed to enquire into what our profession can do towards checking its occurrence in childhood. In the United States the subject is also receiving increasing attention. It does not appear possible to attain as brilliant results by emphasizing the value of sunlight and fresh air as can be obtained in tuberculosis, so many factors appear to enter into the etiology of cardiac disease. It is generally admitted that acute rheumatism is the most frequent cause of this disease and during the past few years its occurrence is considered to be due to infection of a specific organism the streptodiplococcus. Of the life history of this organism we as yet know little. We find ourselves also confronted by many hygienic problems and would emphasize the importance of many predisposing factors such as prolonged fatigue, heredity, environment and faulty nutrition. Certainly in the prevention of acute rheumatism there is a great field for further careful research. The American Heart Association has laid down the following principles to be followed for the prevention of acute rheumatism. First, facilities are demanded for the special diagnosis of suspected or established cases of heart disease, and for the medical supervision of cases unable to pay for private care. Second, provision for convalescent and chronic cardiac cripples, and the establishment of summer camps for cardiac children. Third, vocational guidance for school children with heart defects, and for cardiac wage earners. Fourth, research into the natural history of heart disease, its epidemiology, occupational causes, and the costs and results of preventive work. Childhood is undoubtedly the main period in which concerted effort promises the greatest results. The removal of all foci of disease, the early attention to transitory rheumatic pains, prolonged and adequate

rest and protection during convalescence are the first steps to decrease cardiac disability. This involves the harnessing up of a vast variety of public and private agencies; medical inspectors for the schools, and visiting nurses for the homes, may give valuable aid to physicians working privately or in dispensaries and out-patient clinics. Very important in this disease is the education of the public on the importance of all hygienic measures which may tend to prevent the development of the disease, and of the therapeutic measures requisite for the safeguarding of the heart during and after acute illness. We hope to refer to this matter in future editorials. We also direct attention to the article on heart disease in our present number.

Editorial Comments

We have received the thirteenth annual report of the Manitoba Sanatorium, at Ninette, established for the treatment of those suffering from tuberculosis in the Province of Manitoba. We must congratulate the superintendent upon the general principles which he lays down for the staff in the carrying on of their work. More especially would we emphasize the endeavour always to do a little more than is expected of us; to make the advantages of the sanatorium available at as low a rate as possible; to carry as much as we can of the economic burdens of our patients; to learn all we can from our day's work, and to teach as much as we can of what we have learned.

We note that during 1923, accommodation has been slightly increased. The use of the x-ray in diagnosis and treatment has been extended, and treatment by artificial light and sunlight has been applied in a greater variety of types of disease and to a larger number of patients.

The Province of Manitoba, it is stated, has in proportion to its annual death rate from tuberculosis more beds for the care of tuberculous patients than any other province, yet it receives these patients with the fewest restrictions. The staff have tried to take in all suffering from tuberculosis irregardless of the stage of the disease and for as long as they need to remain under treatment. In no other province is service offered quite so unrestricted. A lessening of receipts during the year is regretted, but the superintendent ends his report hopefully. On looking over the statistics presented in the report few sanatoria can show such excellent results.

INTER-STATE POST-GRADUATE ASSEMBLY

The *Journal* is grieved to learn that invitations to Canadian medical men to attend the Inter-State Post-Graduate Assembly issued and mailed from Milwaukee early in October were held for "Customs Duty" in the Port of Toronto. The ruling of the appraisers was that the programmes were "advertising matter" and upon protest this ruling was changed to "printed matter". The programmes were released for distribution upon payment of the assessed duty by the Secretary of the Tri-State District Medical Association but in the meantime the date of meeting had passed over.

The Executive of the Association has acted vigorously in discussing the incident with the Customs authorities in Toronto, and will if necessary, take it to Ottawa.

Such provincialism is to be condemned.

The *Journal* desires to express regret to the sponsors of the Assembly over the unfortunate incident; also trusts that this explanation will reach those of our profession in Canada who were doubtless surprised and critical upon receiving the announcement of an important meeting two weeks too late.

A letter from the Secretary of the Assembly, Dr. Henes, may be found on page 93.

THE USE OF OPIUM IN INDIA

We have received a copy of a small pamphlet entitled "Opium in India", published by the National Christian Council of India, Burmah and Ceylon. It represents the results of an enquiry into the use of opium in India, undertaken by the National Christian Council of India at the request of the International Missionary Council. The material contained in it has been given by members of the Indian Medical Service, missionary doctors, and private practitioners both men and women. No other aim was set before them except to arrive at the truth. The evidence is summarized under six heads—How opium is used in India, the effects of the use of opium, and an enquiry into the possibility of its legitimate and illegitimate uses, the rarity of opium smoking, the distinction between smoking and eating opium, and lastly public opinion on the subject. We hope shortly to present abstracts of the facts and opinions presented under each of these heads.

A legal case of much interest to the medical profession was tried last month in court at St. John, New Brunswick, in which the Drisgo Laboratories, a firm of men carrying on a drug and licensed liquor business, sued Dr. H. A. Farris, Superintendent of the St. John County Hospital, for libel.

The patients of the Jordan Memorial Sanatorium and the St. John County Hospital publish a little monthly magazine called "The Beacon", and in this Dr. Farris wrote an article entitled "Quackery in the Treatment of Tuberculosis" from which the following was accused of being libellous: "There are many so-called cures for tuberculosis just now in St. John. We have a fake cure for tuberculosis started by a patient who has distorted untruthfully nearly every remark I have made to him. Unfortunately a druggist who heretofore had been considered reliable has taken up with this man and together they are doing a great deal of harm, as a number of patients have given up the proper treatment and are depending on this fake remedy with very serious results."

Dr. H. A. Lafleur of Montreal, Dr. C. D. Parfitt of the Calydor Sanatorium, and Dr. J. H. Elliott of Toronto, in addition to several local physicians testified for Dr. Farris. The Hon. Dr. Pugsley, Dr. W. B. Wallace, and Mr. William Ryan appeared for the Drisgo Laboratories. The Hon. J. B. M. Baxter, Dr. H. A. Powell and Mr. C R. Mersereau defended Dr. Farris. The case lasted over two weeks. The jury unanimously returned a decision of "not guilty" after ten minutes consideration. The costs were not assessed; later on the judge stated that these went with the verdict.

The case was watched in St. John with much interest, not only by members of the profession, but also by many druggists and by the public. We purpose presenting our readers next month with a brief account of the proceedings.

We desire to draw the attention of our readers to the paper by Dr. Collip and Dr. Leitch appearing in this issue on the treatment of tetany by means of a recently discovered active principle of the parathyroids. A case was successfully treated by it.

The Early Diagnosis of Joint Tuberculosis.—Errors in diagnosis of joint tuberculosis by Alan DeForest Smith, New York. In the first two years of the disease, it always is difficult to make a positive diagnosis of tuberculosis of a joint. The only laboratory test that establishes the diagnosis is guinea-pig inoculation, and this inconclusive when negative. The condition is obscured in many cases by immobilization before the diagnosis has been proved. The percentage of error in diagnosis of these conditions is high. The mistake of calling a non-tuberculous condition tuberculosis probably is just as frequent as the reverse. As a result of the large factor of error in diagnosis, much harm is done to the patients, and the statistics about the results of conservative treatment are misleading. Because of the extreme importance of being certain of the diagnosis, exploratory operation is indicated in all doubtful cases.—*Jour. Am. Med. Ass.*, Nov. 15, 1924.

XUM

Correspondence

RELATIONS BETWEEN BRITISH MEDICAL ASSOCIATION AND CANADIAN MEDICAL ASSOCIATION*

Dear Sir:—

At last I feel in a position to write to you on the various points you took up with me in your letters of September 29th and October 31st. The reason I have not written before is that some of the details as regards affiliation at this end were not complete, and also I wanted to be able to report, success if possible, about my approach to the delegates for your Regina Meeting. I will take the items in order.

Affiliation.—The Council of the Association at its meeting on October 22nd received your official letter of September 29th recounting the conditions under which your Association agrees to affiliate with our Association. I take the items of those conditions one by one:

(1) Your Association at its Annual Meeting and ours at our Annual Meeting, 1924, have both formally declared their desire to come to some arrangement for affiliation.

(2) Statement on official documents—

(*a*) You will see by this notepaper that we are setting out the fact that you are affiliated with us. We intend to use this notepaper in all our communications except the few that we send out on a smaller sized notepaper, where the above heading would be overpowering;

(*b*) You will note in the copies of the Handbook sent to you that on the title page the affiliation is mentioned; on page forty-six the fact of affiliation (with the name of your head office, the name of your President and your own name) is mentioned; and on pages 218 and 219 a statement is made about the visit of the British Medical Association delegates to Canada and the reception of their report by our Annual Representative Meeting.

(c) The fact of our affiliation will be mentioned in the next edition of our Handbook for New Qualified Practitioners. This will probably be published in the latter part of 1925 and will, of course, be sent to you.

(*d*) Our Annual List of Members is issued in May of each year and in the next issue the affiliation will be duly mentioned, together with the address of the Canadian Medical Association. A copy will be sent to you.

(3) As regards the regular interchange of official documents. We should like an official copy of the *Canadian Medical Journal* to be sent to several officers of whom I enclose a list.

We note your request that our *Journal* should be sent to your Editor, your President, President-Elect, Chairman of Council and yourself. These instructions will be complied with.

Official copies of the British Medical Association Handbook, the Handbook for Recently Qualified Medical Practitioners, and any other documents of general interest issued by us will be sent to you. I have already sent you a number of British Medical Association Handbooks; copies of future issues of that Handbook and of the Handbook of Newly Qualified Practitioners will be sent to the officers to whom the *Journal* is being sent unless you notify me to the contrary.

(4) The right to use the "Important Notices" in the *British Medical Journal*. The conditions under which this right can be exercised have not yet been settled by our Ethical Committee. But I hope to write you on this before long.

(5) We shall be glad to welcome any of your members who are in England at any time and they should be instructed to ask to see me. I shall see that they are introduced to the Librarian and given the full run of the Library during their visit here, and given access to any other facilities we can offer them. These facilities will, we hope, be considerably increased when we get into our new building next year. The members of your Association visiting this country will also have the right to attend our Annual Meeting and it is desirable that they should make application here for a voucher which will permit them to be so admitted. It would be better still if they had an official card of membership issued by your Association. This would obviate the necessity for the issue of any voucher by us. When a member of

*Forwarded by Dr. Routley, Secretary of the C.M.A.

yours is over here (if we are assured that he *is* a member of yours) we want him to feel that for the time being he is one of us.

We hope that you will nominate delegates for the Annual Meeting at Bath next year and on this special occasion we should be glad if those nominated could be prominent working members of your Association. You will remember that in the week commencing July 12th, 1925, we intend to open our new building. This will be a red-letter day for the Association. We are issuing pressing invitations to every one of our Overseas Branches and we shall be greatly disappointed if our President on that occasion is not surrounded by representatives of all the Dominions and Colonies. We confidently expect Canada to make a good show on this occasion. After the new building is opened the seat of operations will be transferred to Bath, where your delegates, together with the representatives of our Overseas Branches, will be presented to the President on the opening night, Tuesday, July 21st, and other courtesies will be extended to them.

As regards the reciprocal arrangements, we shall use our best endeavours to find out when any of our members are coming to Canada and ask them to represent us officially. As to their welcome we have no manner of doubt.

(6) Occasional interchange of official visits. Sir Jenner Verrall and I fully explained the difficulties as regards a visit of the Association to Canada in the near future, and we understand that it is just as difficult, if not more so, for the Canadian Medical Association to visit us as a body over here. But the Council has decided that the matter is not to be lost sight of and has given instructions that the invitation from Winnipeg is to be put among the other invitations each year until we can see our way to accept it.

(7) Regular interchange of information. You and I quite understand one another on this point. Each of us I am sure will welcome any enquiry from the other and be delighted to do the other a service.

There is one piece of information I should like at your early convenience. Will you tell me what your Association does, if anything, in the direction of individual medical defence of its members? I have an idea that this question was discussed on the Report either of your Executive or of the Executive of the Ontario Medical Association, but I cannot find any documentary evidence. We have been informed that under our constitution we cannot defend the legal interests of a member of the Association, whether in the law courts or otherwise, whose treatment of a case has been challenged by or on behalf of a patient on the ground that it has been unskilful or that he has been guilty of neglect. We can and do take up questions affecting the profession generally, but individual defence in this country is dealt with by separate societies. Can you tell me what you have done in this matter in Canada?

(8) Subscription at special rates to the *British Medical Journal* open to members of the Canadian Medical Association. I should be very glad if you would make an announcement about this in your *Journal* and in any other way that is convenient to you. Members of the Canadian Medical Association can have our *Journal* at the same subscription that direct members of the Association living outside the British Isles now pay. That sum is £1.11.6. All that a member of your Association has to do is to write to the Financial Secretary and Business Manager, British Medical Association, 429, Strand, London, and say that he is a member of the Canadian Medical Association (the way in which he must prove this is a matter which I hope you will be able to clear up at an early date). The Financial Secretary will then present each year in January, to the Bank of Montreal a bill of exchange for £1.11.6, and the Bank will see that the bill is presented to the member, who will endorse it and pay over the sum of £1.11.6 to the Bank. It is necessary to make it perfectly clear that this privilege only applies to members of our Association (of whom there are nearly 400 in Canada) or to members of the Canadian Medical Association, and it will be necessary that the latter should prove that they are members in good standing. Is this to be done by them sending to us a note from you, or can we have from you an official list of members against which the application can be checked?

There is one final point. We agreed that any question of keeping alive the British Medical Association Branches in Canada would have to be dropped. Technically we cannot do this until the alterations in our Articles and By-

Laws have been passed, which formalise the question of affiliation, and that cannot be done until our next Representative Meeting. In the meantime we shall of course do nothing to stimulate any of these Branches and after the Articles have been passed we shall formally notify the Branches that they no longer exist as Branches. We shall, of course, still retain such of our members in Canada as wish to keep up their direct membership, and we could not refuse any member of the profession in Canada who applied to become a member of the Association. But it rests with you to make it clear to members of the profession in Canada that they can get all the privileges of membership of the Association through the affiliation —they can get the *Journal* at the same rate as if they were direct members and when they are in this country on a short stay they will have all the privileges of membership. I trust you will make this quite clear to them in any circulars you are sending out and in a notice from time to time in your *Journal.*

Yours sincerely,
Alfred Cox,
Medical Secretary.

London, W.C. 2,
November 18, 1924.

FREE CLINICS

We have received the following letter from a prominent surgeon in Calgary complaining of the extent to which free clinics have been carried on in the public schools in Calgary. Undoubtedly this question of how far it is wise to develop *free clinics* is a many sided one, and will be pleased to open our pages to a discussion of the subject; and also to the subject of tonsillectomy as viewed by the general practitioner. (Ed.)

To the Editor:

One might have thought that the flood tide of "free clinics" in this western city had reached its height some years ago, but apparently not. The extent to which the "free clinics" idea may be projected and carried out, with the large measure of abuse of privileges attendant thereon has been well exemplified in Calgary during recent years. The problems connected with such clinics are at present moot points of interest with Calgary physicians, the public at large, and the Socialistic element in particular. At the time of writing it looks as though the whole question will loom large in the coming civic elections, especially since an agreement in this connection has been signed by representatives of the School Board and the Calgary Medical Society, upon which the extreme elements do not look with favour. As this phase of the practice of medicine is one with which physicians in cities of a similar size to Calgary have, or will have, to deal, a review will be given of the progress made since the inception of the clinics here.

In 1914 the Calgary School Board inaugurated a free clinic for school children with eye, ear, and nose defects. In this clinic every child, whether of well-to-do, or of poor parentage, could have the requisite operation performed at the General Hospital free of charge, with the exception of a nominal hospital fee of fifty cents. During the past year this fee has been raised to five dollars on account of the loss accruing to the hospital. In 1923 there were 809 operations performed, a percentage of 7.67 of the school population. The majority of these operations were for diseased tonsils and adenoids. The work of the clinic prior to 1918 was carried on by five specialists, but as the system was obviously unfair, these physicians voluntarily relinquished their positions and a single specialist was employed, at first with a salary of $3,000.00 per annum, which was increased later on to one of over $4,000.00. Fault has been found that the clinic was greatly abused by those well able to pay for professional services. As in other cities examining physicians are employed by the School Board who devote most of their time to making physical examinations of the children, but do not direct lines of treatment.

Three other clinics, viz.; the baby and the pre-school age and the orthopaedic were developed, but the latter has been discontinued.

The Executive Committee of the Calgary Medical Society have had the situation under advisement for some time past, and latterly have concluded an arrangement with the School Board, to which I have already referred, whereby, as in the past, all children will be examined by the regular school physicians and when physical defects are found in a child, such

child will be referred to his or her family physician, or to a specialist, who will see that proper care and treatment are administered, and the parent or guardian will pay for the services required. If the parent or guardian is unable to meet the expense, then no charge is to be made. Vaccination will be performed by the family physician or by the city's Medical Officer of Health, and not at the school clinic as heretofore. The agreement may be terminated by the Calgary Medical Society or by the School Board, either party giving two months' notice if a change be desired. Viewing this question from all sides there can be no doubt in the minds of fair thinking people that this new agreement will be of decided benefit to the school children; undoubtedly, better care will be given to each child under the guidance of the family physician; where altruism is necessary good care will be given under his advice.

Of late years other organizations have stepped in keen and expectant and eager to develop new fields of free health work. Through all this the legitimate field of the practicing physician has been greatly encroached upon and toiling hard for a meagre reward he has found it difficult to eke out an existence. Some solution should be found to ease up existing conditions.

G. E. Learmonth

Calgary, Dec. 1, 1924.

INTER-STATE POST-GRADUATE ASSEMBLY*

To the Editor:

Some time during the first week of October, 1924, there were mailed from my office, through the Milwaukee Post Office, almost 70,000 invitations to medical men to attend the Inter-State Post-Graduate Assembly of America, under the direction of the Tri-State District Medical Association, at Milwaukee, Wisconsin, the last week in October, 1924. Of this number, about 6,000 were addressed to our colleagues in Canada.

On October 18th, I received a note from the Collector of Customs and Excise, at Toronto, informing me that the invitations sent into the Port of Toronto, were being held pending the payment of duty tax, our programmes having been ruled to be "advertising matter". I immediately communicated with the Collector and protested against such a ruling, urging him to pass these pieces of mail and explaining their nature and their purpose. In the meantime the great Assembly was held.

Nothing more was heard from the Collector's office until November 5th, several days after the sessions closed. I was informed that the Appraisers now rule our programmes to be "printed matter" dutiable as such, and not "advertising matter". Further technicalities, unknown to me, had to be met, and eventually on November 10th, the "duty" was paid.

May I ask of you, therefore, that you give this matter suitable publicity in your *Canadian Medical Journal*, and inform the medical men of the Port of Toronto, why it was that they received their announcements and programmes at such a late date. We had been assured here in Milwaukee by our postal authorities that our mailing matter would be passed by the Canadian post office.

I sincerely regret that this little misunderstanding occurred. It was a great honour and pleasure to have entertained some of your leading Canadian teachers and clinicians, and I assure you we are looking forward to our visit to some of your medical centers next spring.

Sincerely and fraternally yours,

Edwin Henes, Jr., M.D.
Secretary.

Nov. 24th, 1924, Milwaukee, Wis.

*Forwarded by Dr. Routley, Secretary of the C.M.A.

A recent number of the *British Medical Journal* refers to the visit to England of the Interstate Post-Graduate Assembly of America, a visit which is to take place under the directions of the Tri-State District Medical Association. A dinner was held at Claridges Hotel in London at the invitation of Mr. Philip Franklin, at which arrangements were made for the reception of their guests. The itinerary arranged is as follows:—

June 1st to 7th, London; 8th to 10th, Manchester, Liverpool and Leeds; 11th and 12th, Dublin; 13th and 14th, Belfast; 15th and 16th,

Glasgow; 18th and 19th, Edinburgh, 20th Newcastle.

The opening ceremony of the tour will be held in London on June 2nd at 10 a.m. in the Barnes Hall of the Royal Society of Medicine, when the Duke of York will be present. A series of short lectures will be given at the Royal Society of Medicine on the mornings of June 2nd, 3rd and 4th, and the President of the Royal College of Surgeons will hold a reception at the college on June 5th from 4 to 6 p.m. Thirty-six London hospitals and medical institutions are co-operating. A programme committee has been formed with the following secretaries: Dr. Arthur Ellis, medical; Mr. Girling Bell and Mr. H. W. Carson, surgical; and Dr. Eric Pritchard, for special departments.

To the Editor:

I wish to add my gratitude to the list of missionaries from various parts of the world. We are the only Canadian Hospital in Manchuria and while limited in staff manage to be responsible for a district of 500,000. It is good to get a Canadian paper. It is good to read articles by one's friends. I hope to pay for a *Journal* for myself for next year.

With all good wishes,

S. Havland Martin.

St. Andrews Hospital,
Lung Ching Tsun, China,
Nov. 18th, 1924.

Importance of Hematuria as a Symptom.—For the present communication, Arthur L. Chute, Boston, has gone over a series of 100 cases of hematuria to see how they compared with those reported previously. The source of the bleeding was the prostate in fourteen cases; the bladder in forty-six cases; the ureter in seven cases, and the kidney in forty cases; in seven patients there was a double lesion, thus accounting for 107 lesions in 100 cases. Of the fourteen bleeding prostates, none were of the fibro-adenomatous type, and gave no evidence of malignancy; one hematuria of prostatic origin was the result of a prostatic abscess of nonvenereal type, while the remaining four were due to malignant disease, nearly one-third of the cases. In the forty-six cases of bleeding of bladder origin, twenty-six came from a bladder growth that was of the broad-based, infiltrating type—the type that ordinarily is found to be adenocarcinoma microscopically; eleven from a bladder growth of papillomatous type; in ten of these eleven cases it was that type of papilloma usually found by the microscope to be papillary carcinoma. In this sort of papilloma, the growth often fills a good part of the bladder, and the tendency to recur is marked; it is of low malignancy in some cases, and of high malignancy in others. Only one of these eleven papillomas was clinically of the simple or benign type, which seemed to be suitable for fulguration. The other thirty-five were actually malignant or potentially so. In other words, more than 75 per cent of the hematurias of bladder origin were due to growths that were actually or potentially malignant. In the seven cases in which the hematuria was of ureteral origin, there were no instances of malignant involvement. In some of these instances, however, the hematuria did indicate a condition that was serious enough to lead to the destruction of the kidney. In the forty cases of hematuria that were of renal origin, the incidence of malignancy was relatively small; there were but five cases of new growths; or 12 per cent; these growths were all hypernephromas. Fortunately, these growths frequently show a tendency to bleed in a relatively early stage of the disease. Seven cases presented renal tuberculosis, a lesion that means the destruction of the kidney in almost all instances; besides this, there were eight instances of hydronephrosis, six of pyelonephritis, and ten of renal stone. Taken as a whole, we find that hematuria has in this series of cases been due to the presence of malignant disease in 44 per cent; that in a number of other instances it has indicated a condition which, though not malignant, would probably lead to the ultimate destruction of the organ involved, and, in some instances, possibly to the loss of the life of the patient as well.—*Jour. Am. Med. Ass.*, Oct. 25, 1924.

Abstracts from Current Literature

MEDICINE

Reasons for the Frequent Occurrence of Tuberculosis at the Apices of the Lungs. Walsh, J., *The Amer. Review of Tuberc.*, Oct., 1924.

The writer opposes the generally held opinions regarding the cause of the greater frequency of tuberculosis at the apices in pulmonary phthisis. His reasons are based on several points. (1) It is taught that the comparative mechanical inactivity of the lung at the apices predisposes to the development of disease at that point, and yet, he points out, it is claimed at the same time that inactivity of a part is a fundamental requirement in the cure of tuberculous disease. Since the latter is a principle beyond question it appears to him a most convincing proof of the activity of the apex being responsible for its being so vulnerable.

(2) Tubercle bacilli are distinctly aerobic and the fact of their developing more freely at the apex points to greater aeration of that part rather than less.

(3) He has always noted that in emphysema there is a more marked distension of the alveoli at the apex than elsewhere in the lung.

(4) Anatomically the arrangement of the muscles overlying the apex allows for freer expansion locally; at the apex the muscles are vertically placed, whilst they run transversely on the lateral walls, and it can be seen in inspiration that the apex expands whilst the intercostal spaces are drawn in.

(5) Microscopically it is found that the apical alveoli are generally larger than elsewhere in the lung whilst being of about equal size throughout the child's lung.

(6) From the point of view of physics it is to be expected that the apex will be inflated most because air naturally ascends in a distensible bag. Even in expiration it may be that the air in the apex will be forced back to some extent by that from the lower part of the chest.

He next demonstrates that the physical conformation of the bronchial tubes allows the tubercle bacillus to reach the apices, especially the right apex, more readily than other parts of the lung. Certain defences exist of course, such as the numerous changes of direction in the airway, the moist mucous membrane with ciliated epithelium, and the residual air. These, however, may be passed and then the apex becomes most readily attacked, for there is the tendency for the air to rise, the greater suction of the alveoli of the apex (since they are generally larger) and the fact that the paravertebral bronchus rises almost vertically compared with the more sloping lower lobe bronchus so that particles in the entering air will the more easily strike the walls and be checked; also the right lung draws in a greater volume of air since it has the greater capacity of the two lungs. H. E.M.

The Treatment of Post-Encephalitic Parkinson Syndrome with Hyoscin Hydrobromide, with Report of Eighteen Cases. Hohman, L. B., *Johns Hopkins Hosp. Bull.*, Oct., 1924.

The use of hyoscin hydrobromide in small doses was recommended by Erb in 1901, to relieve troublesome symptoms in cases of paralysis agitans; he found it possible to use it for long periods with no loss of its efficacy and with no inconvenient complications. From 1921 onwards the drug again came into prominence as a valuable remedy in the post-encephalitic Parkinson syndrome, and the writer reports results in a series of eighteen cases of these so treated.

The first patient of the series was treated in 1921 so that the period of observation has been of fairly long extent. In every one of the eighteen, some improvement was noted, not only physically but mentally and this could be readily shown by taking patients off the drug. when they would at once become aware of the difference in their mental outlook. This effect is specially emphasized.

The improvement noted was graded as slight, definite or marked. In the first class there were six cases, and these showed some relaxation of rigidity and an improved mental attitude. Five were definitely improved being fully active after partial invalidism, and seven were

XUM

markedly improved, as shown by their return to work after months of invalidism, and by an ability to look after themselves after being bedridden and helpless.

The use of the drug in other post-encephalitic conditions, such as depression and behaviour disturbances was in no case effective. The writer holds that the pyschoneurotic states are probably due to organic changes. Since the Parkinson syndrome is of late development after this disease care should be taken in giving a prognosis as to its possible appearance.

The dosage varied from 1/150 gr. four times a day, to 1/50 gr. at the same intervals. No ill effects were noted in any case, beyond occasional symptoms of vertigo, somnolence and loss of accommodation; these however disappeared with regulation of the drug. H. E. M.

Problems in Hypertension—An Attempt to Correlate Hypothetical and Practical Considerations. Neuhof, Selian, *Am. Jour. Med. Sc.*, November, 1924.

Notwithstanding the many-sided investigations on this subject, it still remains unsettled in many of its details. It can, however, be positively stated that pathological hypertension in its final analysis, is due to contraction of the systemic arterioles and capillaries. Capillary constriction need not, however, go hand in hand with constriction of the arterioles. The capillary mechanism seems designed so that the blood volume may be increased at some point where the requirement of the tissues calls for it, by constriction of the capillary bed in other parts. Neuhof thinks that "Essential hypertension" is a poor name for high blood pressure without known organic pathological basis. He prefers the term "hyperpiesis" or "functional hypertension". A systolic blood pressure of 150 or over was the criterion which he adopted in considering a case as one of hypertension; and the following groups are specified:

(1) Abnormal vaso-constrictor influences originating from the higher cerebral centres: In this group belong the individuals of unstable vasomotor mechanism, whose vasomotor centres react in a marked degree to hypertensive influences.

(2) Reflex influences emanating from aortic disease: Filaments from the vagus and sympathetic nerves constitute a nerve mesh surrounding the aorta. Irritation of this nerve mesh may lead to afferent stimuli to the vasomotor centres, resulting in constrictor effects. Thus, temporary hypertension with praecordial pain and paroxysmal dyspnoea may come about during inflammatory recrudescence in cases of luetic aortitis. Also, in cases of pure aortic disease of rheumatic origin in young people with aortic regurgitation, the tremendous ventricular fling of a large volume of blood into the aorta, by excitation of this periaortic nervous meshwork, brings about hypertension reflexly. Again, an important factor, probably, is the general tissue anaemia, resulting from aortic disease with the accompanying myocardial change, which brings about vasoconstriction in some areas, so as to insure a proper blood supply to other parts—a compensatory effort.

(3) Reflex influences emanating from coronary disease. In this group are classed those cases without gross signs of cardio-renal mischief, who, however, present hypertension, usually moderate, and praecordial pains. The hypertension in these cases is not constant, and the praecordial pains are often felt after meals, or after exposure to cold winds, and are often associated with eructations of gas and pyrosis. The physical findings in this group may be practically negative, and yet sudden death may be the outcome. It is thought that the increased blood pressure in these cases is nature's effort to increase the blood supply to the heart, it having been shown experimentally by Starling that if the general blood pressure be raised, the coronary output is increased; and conversely, that if the coronary pressure in a dog's heart be artificially raised, the failing heart will revive.

(4) Temporary hypertension from functional cardiospasm: This is a form of hypertension found in the "rushing" types of individuals, usually stout, between the ages of thirty and fifty years, who bolt their meals, etc. The symptoms of cardiospasm are mild. They are relieved by atropine before meals, with antacid after meals.

(5) Hypertension with auricular fibrillation: This type tends to disappear with the restoration of normal rhythm by quinidine, etc. It probably is compensatory in origin, being an

effort of nature to make up for a deficiency or oxygen want at the periphery.

(6) Hypertension with endocrine changes or with exophthalmic goitre: This type is found particularly in women, at, or near the menopause, who have an abnormal nervous excitability. It may be due to a pituitary hormone, having pressor influences; there is very little evidence of an "adrenalaemia" in these cases. In exophthalmic goitre, the overacting ventricle brings about an irritation of the "aortic nerve mesh" before mentioned.

(7) Nephritic hypertension: The hypertension does not proceed *pari passu* with the amount of kidney damage as revealed at autopsy, but is generally present where there is "arteriocapillary fibrosis" of the capillary tufts, and is often absent where the larger arteries only are involved. Not infrequently, frank nephritics feel better with a blood pressure, say of over 200, than with a pressure of 180, possibly showing less oedema and less dyspnoea at the higher level. The author thinks this may be physiological—a vasoconstriction in some areas in order to shunt more blood volume into needful areas.

A. T. HENDERSON

An Epidemic of Lead Poisoning Caused by the Sandpapering of Automobile Bodies. Dean, A. S., *Jour. of Industrial Hygiene*, Oct., 1924

In the summer of 1922 an epidemic of lead poisoning occurred in Detroit, Mich., and it was found that the majority of men poisoned had been employed by a certain automobile body-manufacturing company (referred to as "A"). This led to an investigation into the conditions in the factories of this and seven other large similar corporations, with regard to the methods followed in this occupation.

Analysis of hospital admissions for lead poisoning for the past four years, in Detroit, showed that the majority were men who had been employed by Company "A", to rub with dry sandpaper the undercoats of paint on automobile bodies. By the method followed in this factory the body of the car received four or five coats of paint, analysis of which showed the presence of lead; workmen known as "sanders" then rubbed the paint, when it was dry, to produce a smooth surface for the application of the colour varnish. The men rubbed at the bodies of the cars as these moved along in front of them on a track. Above them was a large hood with an exhaust pipe, and this drew the dusty air up past the men's faces. In one other plant no artificial ventilation at all was used. Most of the men tied cheesecloth over their heads to cover or partially cover their nostrils and mouths, and this cloth was renewed every day or so by the company. It was stated that the amount of cloth thus used cost the company $1200.00 per month. If sponges were used as well they were supplied by the men themselves: as a rule they refused to wear the respirators supplied by the company. Examination of one piece of cheesecloth which had been worn for one day only, was found to contain 81 mgm. of lead, and it was calculated that very large quantities of lead might be inhaled during the working day.

Compared with other companies, it was found that only one followed the same method as Company "A" in rubbing the paint, and in this factory a downward draft of air was established to an open-work floor, so that the dust was not drawn past the face of the sander: there had been no cases of poisoning reported from this establishment. All the other companies visited used water and pumice stone instead of sandpaper, on the car bodies.

It is pointed out that in England two of the largest motor companies successfully use leadless paints. In January, 1920, a commission had recommended to the Secretary of State for the Home Department the prohibition in these works of the use of any paint or filling material containing more than five per cent of its dry weight of a soluble lead paint. H. E. M.

SURGERY

Hydro-ureter and Hydronephrosis Secondary to Prolapse and Cystocele. Young, Jas., *Edinburgh Medical Journal*, Nov., 1924.

Dilatation of one or both ureters with hydronephrosis is not uncommon in cases of marked rectocele and cystocele.

Compression of ureters by the displaced uterine arteries or pressure on the ureters against the rigid pelvic outlet by the descending hernia are given as probable causes for the condition.

The author strongly advises thorough investigation of kidney function prior to operations for procidentia. A. D. CAMPBELL

Cure of Incontinence of Urine in Women. Miller, C. J., *Am. Jour. Obst. and Gynaec.*, Oct., 1924.

Incontinence is found to be comparatively frequent not only in multipara but in women who have borne no children. Analysis of a large series shows that control is poor or lost in 8% of nulliparous women; in 14% of para ii to iii; in 29% of para vii to ix. Marked cystocele is not necessarily present but if patient is examined in standing position and made to strain or cough the urethral meatus is noticed to point upwards.

The author ascribes the condition not to injury of the sphincter of the urethra but to the weakened fascia supporting it. Laxity of fascia allows the urethra to sag. Incontinence in nulliparous women is explained by the natural weakness of fascial support; such individuals have a shallow perineum and have a bulging of the anterior vaginal wall.

The author employs a compromise of Kelley's operation and Clarke's anterior colporrhaphy, restoring the fascia by U-shaped suture, not interfering with the urethral sphincter.

In cases where surgical procedure is not advisable or convenient the Ring Hodge or Smith pessary by supporting the superior vaginal wall have proven satisfactory measures in the treatment of incontinence. A. D. CAMPBELL

Ethylene and Oxygen Anaesthesia for Gynaecological and Obstetrical Work. Heaney, N. S., *Am. Jour. Obst. and Gyn.*, Oct., 1924.

The author has employed ethylene and oxygen anaesthesia in a large series and has found it most valuable where the patient is a bad risk, e.g. in nephritis, diabetes, cardiac or pulmonary disease or in debility in the aged. In some abdominal cases, in addition to the gas, ether was temporarily used where much interabdominal manipulation required a deeper anaesthesia. In the delivery of women, two inhalations usually produced analgesia and between pains the patient was usually quieter than after nitrous oxide. The blood during ethylene oxygen anaesthesia is usually pinker: there is a greater tendency for the emptied arteries to bleed than with nitrous oxide, but less than with ether. No ill effects were noted to mother or child in cases in which this anaesthesia was used.

Unfortunately ethylene when diluted with oxygen is highly explosive, the slightest static spark causing a violent explosion. The author states that by "grounding" the mask to the machine and the machine to water-coil he has had no explosions.

Apart from the danger of explosion and the disagreeable odor the gas is superior to nitrous oxide and is equally as safe as an anaesthetic. A. D. CAMPBELL

Milk Injections in Gynaecology and Obstetrics. Gellhorn, Geo., *Am. Jour. Obst. and Gyn.*, Nov., 1924.

Introduction of foreign proteins subcutaneously, intramuscularly or intravenously have the property of stimulating the cells of the body by activating the protoplasm. Normal blood—either human or mammalian—will produce a general systemic reaction; substances like antitoxins, immune sera or egg albumin will produce similar results. The author has employed milk as the foreign protein.

Technique—Sterilize by boiling for ten minutes in water bath. After cooling injection is made deep in the gluteal region as in mercurial injections. *Dosage*—4 to 10 cc. at intervals of three to five days, depending on the case.

General reaction is noted in from six to eight hours after administration. Leukocytosis, pyrexia, and general malaise with headache and pain at point of injection and at the site of the pathological lesion. Reaction more marked with the initial dose. No instance of anaphylaxis has been noted. The author has used this with signal benefit in a wide range of cases but warns that it is not a panacea. In pelvic inflammatory disease with pyosalpynx all evidence of the existing condition disappeared after ten to fifteen injections. In acute gonorrheal infections and Bartholinitis has in large percentage of cases been most valuable. In cases of endocervicitis it has been of little value. It has been used repeatedly in puerperal infection and in low grade post-operative pneumonia with success. The author speaks only of gynaecological cases and feels that it has been of inestimable benefit in nearly every instance. Other observers have used milk in local injection—e.g. boils, abscesses, etc.

As a galactagogue the author has not employed it sufficiently to judge.

Much has yet to be done on protein as regards its specific action and dosage, but undoubtedly, while its use is as yet rather empirical, it is a valuable agent. A. D. CAMPBELL

Bladder Injury During Hernia Operations. Watson, L. F., *Am. Jour. of Surgery*, April, 1924.

Large irreducible, or strangulated hernias often present unusual difficulties, sometimes taxing the skill of the most experienced operators. The danger lies in accidental injury to the bladder, intestine, blood vessels or vas deferens. The bladder is involved in about 1 per cent of all inguinal hernias in adults. In certain cases, it is only by a most careful examination of the sac that bladder injury can be avoided. Bladder wall should be suspected when the sac is thick, when it is covered by a quantity of lemon-colored properitoneal fat, or when there are numerous blood vessels on its surface. When the bladder is in the sac wall, it is nearly always on the inner side, and for this reason the sac should always be opened at a thin white point on the outer side.

Hernia Following Appendectomy. Watson. L. F., *Chicago Medical Recorder*, March, 1924.

The usual causes of this hernia are postoperative suppuration in the abdominal wall; the use of drains that are larger than necessary; a faulty closure of the muscle and fascia layers; the division of nerves supplying the muscles; and the use of the wrong incision. The Mc-Burney incision gives the lowest percentage of postoperative hernias.

An elliptical incision should be used if the sac is thin and adherent to the skin; if the sac is not adherent, a vertical incision saves time. Nothing is gained by opening the fundus—the adhesions here often make it difficult or impossible to reach the neck of sac—and time is saved by beginning the dissection at the neck and working inward. The author found that the simplest method of exposing the hernial opening is to invert the sac on one or two fingers, and feel the sharp fascial edge which is usually most distinct on the outer side of the hernia near Poupart's ligament. With the finger as a guide, the incision is made directly down to the fascia. The abdominal wall should be reconstructed as well as possible; and the muscles and fascia used as a single flap which is brought down and broadly overlapped by a second flap secured below from the external oblique aponeurosis.

PAEDIATRICS

The Value of Blood Smears in the Diagnosis of Pertussis. Heiman, H., *Arch. Ped.*, June, 1924.

The difficulty in diagnosing whooping cough in its early stages is largely responsible for the spread of the contagion. With a view to finding some simple method of detecting pertussis Dr. Heiman made use of the fact that a relative lymphocytosis occurs in this disease. A blood smear was taken and stained with Jenner's dye. One hundred white cells were counted and grouped either as polynuclears or lymphocytes. Of the 300 cases in his series 124 were undoubtedly pertussis and 65% of these showed a definite lymphocytosis. Of eighty-four cases with a suspicious cough which later became unquestionably pertussis 82% showed a very definite lymphocytosis. Of fifty-seven cases with a suspicious cough, which later turned out not to be pertussis only 17% showed lymphocytosis. A suspicious cough and a lymphocytosis would therefore justify one in making a tentative diagnosis of whooping cough and recommending isolation. L. M. LINDSAY

Observations on the Metabolism of Recurrent Vomiting. Ross, S. G. and Josephs, H. W., Baltimore, *American Journal of Diseases of Children*. October, 1924.

This paper records some studies made on a case of recurrent vomiting in a young child. The case report shows that the child had several illnesses in infancy, each associated with an infection, accompanied by fever and vomiting, sometimes convulsions and coma, and acetonuria. It was noted that recovery was prompt following the administration of glucose. Experimentally it was found that the administration of a high fat diet (16 per cent cream) produced vomiting and drowsiness in a few hours; cessation of the symptoms followed the cessation of the diet. Also, starvation produced the same symptoms at the end of thirty-two hours on two out of four occasions.

The authors noted that there was a sudden and marked fall in the blood sugar, the fall being more rapid than in the control children,

and that there was a markedly rapid rise in acetone body production, when the above symptoms were produced by artificial starvation. It is suggested that when, owing to infection and fever there is an increase in metabolism, and a sufficiently prolonged and complete withdrawal of carbohydrate, dependent on the anorexia, the vomiting, and other symptoms may be produced in certain children who are unable immediately to utilize their carbohydrate reserve, or who, utilizing their carbohydrate reserve do so very rapidly, producing eventually the same condition of hypoglycemia. The symptoms of this condition in these patients correspond very closely to those produced by over-dosage with insulin in the treatment of diabetes—coma or drowsiness, convulsions and muscular twitchings. With the drop in the blood sugar there is a corresponding drop in the combined carbon-dioxide of the serum which is a measure of the ketosis.

The authors point out that with the production of aketosis there is also an increase in protein catabolism with an increase in the nitrogen excretion—the protein apparently serving as an antiketogenic substance. Glucose has apparently a specific effect in bringing the attacks to an end; even when given in small amounts by the mouth its administration is followed by recovery in a few hours. It is suggested that the hypoglycemia is the determining factor in the convulsions which sometimes occur at the onset of the attack.

There are included in the article many carefully worked out tables of data covering the metabolism of the case under review and the controls on which their conclusions are based.

R. R. STRUTHERS

ANAESTHESIA

The Use of Chloroform and the Misuse of Ether. Jones, W. H., *Proceedings of the Royal Society of Medicine*, Oct., 1924.

It should be realized that deaths on the operating table associated with ether are not uncommon. Commoner still are deaths from chest complications after operation. Sir. W. I. de C. Wheeler, President of the Royal College of Surgeons of Ireland, is quoted as saying that "Every surgeon knows that, apart from prolonged dangerous operative procedures and apart from chloroform anaesthesia and from such conditions as the status lymphaticus and unrecognized idiosyncrasies, there are times when a patient collapses and approaches the point of death on the table. The exact cause of the collapse is not always evident, nor is it always the same. On some occasions the anaesthetic is responsible."

Arrest of respiration and secondary heart failure from slight obstruction to the airway resulting in deficient aeration can occur as certainly under ether as under chloroform. One has to be cautious in accepting accounts of shockless operations performed under non-toxic anaesthetics or very light anaesthesia. Individual surgeons and anaesthetists sometimes indulge in too much idealism. The concentration of mind on ideals induces self-hypnosis in which visions of perfect performance are seen. The anaesthetist who can always secure relaxation of the abdomen with a light anaesthesia works with a surgeon who handles the abdominal contents with such delicacy as not to produce any reaction.

Ether is often used in totally unsuitable cases. It is dangerous in old people, especially if they are asthmatic or bronchitic or the operation is too long. Any infection of the bronchi or lungs is a contraindication, especially tuberculosis. The pneumonia which follows long operations on the upper abdomen is in most cases due to the prolonged administration of ether and the preliminary use of narcotic drugs which increases the deficiency of lung ventilation and lessens the rate of ether elimination afterwards.

To take shelter behind the immediate safety of ether is as dangerous as to use chloroform itself. The risk of chloroform when the patient has first been thoroughly anaesthetized with ether is extremely small. In abdominal operations the patient having been anaesthetized with gas and ether the exaggerated type of breathing is found to be a hindrance to the surgeon. If chloroform be now used instead of ether the condition of the abdomen becomes ideal. The muscles are relaxed, breathing is light, the colour is good and there is less loss of heat due to fast and deep breathing. The exploration of the belly should be done while the patient is deeply under ether, and before the change to chloroform is made.

W. B. HOWELL

Medical Societies

THE PRESIDENTIAL ADDRESS AT THE OPENING MEETING OF THE TORONTO ACADEMY OF MEDICINE

The address of the president of the Academy of Medicine in Toronto has always been held to represent the views of the profession of the province put forward in an "ex cathedra" form, and it is no exaggeration to say that that address is by far the most influential of Ontario's medical pronunciata reaching as it does a compact organization of seven hundred active medical men. The address has already been published in full in two *Journals** and will be of the greatest interest to any one who may wish to get a comprehensive view of medical progress and of medical problems in that great province.

In the address the upbuilding of the present Academy is briefly sketched and the details leading up to the planning and building of the beautiful Osler Hall are touched upon, (it may be mentioned here that Osler Hall is within a few yards of the spot on which Osler as a young student of divinity stopped to listen to the arguments put forth by the late Jukes Johnson which redirected him to the sciences). The future of the Academy as an organization formed by the fusion of four active medical societies is, in the judgment of the president, one of much brightness if we may judge by present activities and past accomplishments. Of the great men and minds associated with the Academy's progress, Dr. Smith puts forward for our consideration J. E. Graham, William Osler, J. F. W. Ross and Richard Reeve, sponsors of no uncertain standing in a medical hierarchy, sponsors whose unselfish care must certainly have guided well the infant institution.

From a material standpoint the profession is reminded that the Academy is beginning to loom large; 750 fellows, 15,000 volumes on its shelves and assets of $126,000 make one realize that the Toronto profession has an organization in their midst that compares more than favourably with the medical associations of the larger commercial cities of the world. A budget of $10,000 is "big business" for a medical society in a country of Canada's size, yet the budget and business is the least of the Academy's performances; most of the provincial problems have fallen onto the Academy's shoulders at some time or other; for many years the fights and crusades were engineered from the Academy building in the Park, though in recent times the excellent organizations of the Provincial Bureau and the Ontario Medical Association have assumed their share in the various medical campaigns. "Much has been done, much is yet to do", appears to be the watchword in the president's address.

The development of medicine and surgery and the depiction of milestones on the road of progress, part of every presidential presentation, constitute the continuation of the address; discoveries of the past and present are considered briefly in an historical sketch, a sketch which the medical student might well have put before him as showing what the busy practitioner can find time for, if so inclined; one is delighted with the many references to the life and work of the giants of medicine of the past, and one realizes more than ever the necessity of familiarizing one's self with the history of the craft, when he reads the words of Pasteur which so effectively settled the question of spontaneous generation, and remembers further the fact that the leading exponent of this theory of that time has passed away only within the last few years. (Bastien).

The position of the Academy as Mentor of the teaching staffs of the universities is wisely and gently urged by Dr. Smith, (and without question the post-graduate activities of a medical association are the methods by which the young graduate reshapes his early moulding). Dr. Smith would have the practical experience of the outside practitioner pass on the value of many of the special procedures and specialties before they are received as gospel by the profession at large or by the student body. We will all agree with him in deploring specialism as we sometimes see it to-day; and the

**Canadian Practitioner* and *Canadian Journal of Medicine and Surgery.*

specialist who so often seems to believe that to announce his specialty is equivalent to possessing the special knowledge of his subject, which only years of practice can give. Of the many problems and questions discussed by Dr. Smith there are of course those that are local in character, dealing with the regulation of practice in Ontario and with the limitation of the activities of the various cults; others are of interest to both the profession and the public. The repetition of the warning against unnecessary surgery comes none too soon, and the touch of history in the references to the times of Lawson Tait and bloody surgery should be known to all. The cry of the man on the street for more detailed information regarding the progress of the science of medicine must be listened to; the daily papers will put their own interpretation on various conditions unless we give them easily understood statements regarding the causes of disease, and the best methods of maintaining health. Dr. Smith refers to the publication in full of Sir David Bruce's review of the progress of preventive medicine in a British daily; one hesitates to add that the same paper at about the same time contained a half page advertisement of a notorious cancer cure.

The concluding paragraphs are a mine of good advice and sound principles—"hitherto we have not laid sufficient stress in our university education upon those essentials of greatness without which no profession can be truly honourable". "Education does not always carry with it the other qualities of good citizenship". "It has seemed impossible to obtain sufficient time in the curriculum to impress on the students the principles of purity, gentleness, goodness and love, without which no doctor is fully prepared to practice his calling". "Be true, loyal, and courteous to your colleagues for thus only can you build up the best type of character in yourselves". The final sentence "serve your patients with complete devotion and conscientious care, avoiding the idolatry of wealth, so that you may receive the blessing of the faithful, as those that have done their duty, even unto death", ringing like an excerpt from the gospel of Saint Luke, is a fitting termination to Dr. Smith's comprehensive presentation of the facts and principles of our profession. N. B. G.

DISCUSSION ON ACUTE OSTEOMYELITIS*

JOHN FRASER, M.D.

British Medical Association Meeting, 1924

Four distinct parts are recognized in any long bone, namely, the shaft or *diaphysis*; the *epiphysis* at one or both extremities as long as growth in length is taking place; separating this from the diaphysis is the *epiphyseal cartilage* or plate, and lastly the *metaphysis*, or that portion of the diaphysis which is adjacent to the epiphyseal cartilage. In the study of osteomyelitis the metaphysis is by far the most important part of the bone; it is the site, during the years of growth, of the most intense cell activity; it is the most vascular area of the bone; and because of these two facts it is the site of origin of most of the inflammatory diseases in bone. Disease as a rule has its beginning in the marrow and travels outwards. An acute primary periostitis is a rare event.

Osteomyelitis is the result of acute pyogenic infection usually during the age of growth, and may be considered as a general systemic infection with local bone lesions. In its very early stages it is not uncommon to find transient local pain and tenderness in several of the bones. As a rule, only one bone remains affected. In a few exceptional cases the infection may spread from a neighbouring joint by the perivascular lymphatics and the epiphysis is then more liable to be involved.

The source of the infection may be a septic tooth, an infected tonsil, an inflammation of one of the sinuses, or furunculosis; pneumonia and the exanthemata are less frequently responsible. The author believes that umbilical sepsis occurring at birth and lying dormant until the years of later childhood, may be an occasional source.

The upper end of the tibia, the lower end of the femur, the lower end of the tibia, and the upper end of the humerus are the common sites, and the frequency with which each site is affected is in the order stated. Trauma is an influence of great importance and explains why the lower limbs are so frequently involved. It may be slight, yet sufficient to

*Brit. Med. Jour., Oct. 4, 1924.

arrest the circulating organism and so localize the disease. The surface extent of the metaphysis is the second influence.

The organism mainly responsible is the *Staphylococcus aureus*, which is found in 78%. The pneumococcus is present in 14%. The disease is most common in boys, between the ages of eight and twelve years. The primary stage of the disease is the most dangerous as it is during this period that septicaemia is most likely to occur. Sir William Macewen has stated that within a few hours of the onset, the osteoblasts of the interior have migrated *en masse* to the deeper layers of the periosteum. It is during this stage that the agonizing pain and signs of toxaemia, the high temperature, the delirium, and the poisoned appearance, are greatest.

During the second stage, pus travels through the Haversian canals into the subperiosteal area. As the tension is relieved there is an immediate abatement of the signs and symptoms. The length of the first stage bears a definite relation to the porosity of the bone. The earlier the second stage appears, the better is the prognosis.

The third stage is taken up with the repair of the injury, the formation of an involucrum around the periphery of the original shaft, the appearance of granulation tissue in the interior of the bone, and the separation of the sequestrum. Later on the involucrum is removed through the medium of the osteoclasts.

Osteomyelitis may be confused with acute rheumatism and with cellulitis. The white cell count in rheumatism is not as high as that met with in osteomyelitis; it is usual to find more than one joint involved. In osteomyelitis, if firm, steady pressure is applied to a part of the shaft which is free from swelling and remote from the spot of greatest tenderness, the patient will cry out with pain, but only after the lapse of an appreciable interval of time. Cellulitis may be mistaken for osteomyelitis when the soft tissue infection overlies a bone, but in this case the toxaemia is not such a marked feature. Too much stress must not be laid on the x-ray findings as in the early stages little or no change is shown in the skiagrams.

A general rule may be formulated that the more distal the focus of infection the more favourable is the prognosis. A few cases, mostly pneumococcal in origin, may subside without any surgical interference. They occur in babies and young children, and the symptoms are much less severe. The treatment consists in extension of the limb, fixation splints and hot local applications. The great majority of cases, however, permit of no delay in exposing the marrow cavity in such a way that efficient drainage is established. The cortical bone overlying the affected metaphysis is perforated with a trephine or large burr. A series of openings is made along the line of the shaft at intervals of about three-quarters of an inch until healthy marrow is exposed. The series is now converted into a common opening by removing the intervening segments with a chisel. The underlying marrow is never interfered with. The wound is left open and treated by the Carrel-Dakin method. In about three weeks a partial closure of the wound by secondary suture can be attempted. The author tried subperiosteal resection of the affected bone only to abandon it. In only one condition does he advocate its use; that is where the infection is very extensive and the complete diaphysis is a sequestrum. In this case he performs a diaphysectomy.

In the treatment of the general condition the writer makes use of several agencies. On the first day a dose of 200 millions of a stock staphylococcal vaccine is used; 400 million is given on the third day and repeated on the fifth. Thereafter the autogenous vaccine is used every fourth day. If the case is very severe or does not respond to vaccine treatment then serum therapy is advocated. Either a stock serum, a specially immunized serum, or ordinary horse serum may be used; 10 cc. is given as an initial dose and increased daily up to 100 cc. Blood transfusion has also proved of much value in certain cases. Colloidal tin and manganese have given good results. Yeast has also been suggested as an aid. GEO. A. FLEET

Obituary

DR. W. RAY HODGE

Dr. W. Ray Hodge died at his home, 33 Roxborough Drive, Toronto, on Saturday, November 1st. Through his death the profession and medical science suffer a great loss.

The late Dr. Hodge was born at London, Ont. on March 4th, 1890, the only son of the late Dr. George Hodge. His elementary and preparatory school training was acquired in London and he passed his matriculation examinations from the London Collegiate Institute in 1908. The following autumn he entered the University of Toronto, enrolling in the physiology and biochemistry course. He obtained first class honours each year, and led his group in this course when he was graduated B.A. in 1912. He proceeded into the clinical course and was graduated M.B. in 1915, his standing having been maintained sufficiently to entitle him to election to the Alpha Omega Alpha Honour Society in 1913. As a senior student he enlisted as a private in No. 2 Casualty Clearing Station in September, 1914, and proceeded to England with that unit in the spring of 1915. He was commissioned in the R.A.M.C. on May 24th, 1915, and in the same year went to Egypt with the 94th Field Ambulance. While serving in the Canal Zone he was promoted to captaincy and after a few months of service he proceeded with his unit to France. Later he was sent to Mesopotamia whence he was invalided to England in 1916. He returned to Canada late in 1918 and was appointed a medical officer to the D.S.C.R. with which he served, chiefly as a laboratory worker, until the end of 1919. He was admitted as M.D. by the University of Toronto in 1919. After a term on the resident staff of Toronto General Hospital he was appointed in 1920 to be assistant physician to the hospital, and junior demonstrator in medicine by the University. These appointments, which he held until his death, were supplemented by his appointment as research associate in the Connaught Laboratories in 1924.

DR. W. RAY HODGE

A remarkably unobtrusive manner made it difficult for acquaintances to fully appraise his worth, unless their associations with him were sufficiently close to lead to intimacy. He was as highly intellectual as he was industrious, and his unusual accomplishments in such a short career bespeak the extent of his industry. Nor were his interests confined to medicine. He was always conversant with the world of affairs though in it his activities were restricted by his assiduity in his profession.

The intensive training which the late Dr. Hodge had acquired in both laboratory and clinical medicine peculiarly fitted him for the work at which he was engaged at the time when he was stricken by pneumonia. He was attempting to produce an antitoxin for scarlet fever by methods which were the sequence of the discoveries published earlier in the year by Dick and Dick, and by Dochez. At the same time he was energetically endeavouring to uncover phases of the subject which are as yet unexplained. Two papers on the subject of scarlet fever were in the course of preparation for presentation before the Academy of Medicine of Toronto.

A severe attack of pneumonia set in on October 23rd. The type was so severe that it was overpowering from the onset, and death occurred after an illness of ten days.

The following papers may be mentioned as among Dr. Hodge's contributions to medical science.

(1) "Streptococci in Chronic Respiratory Infections," by W. Ray Hodge and C. Cohen, *Jour. of Inf. Dis.*, April, 1922, xxx, 4, p. 400-417. (2) "The Relationship of Lipoids and Proteins to Serum Reactions in Tuberculosis," by W. Ray Hodge and M. F. MacLennan, *Jour. of Immunology*, May, 1922, vii, 3. (3) "An Attempt to Isolate a Filter-Passing Virus in Epidemic Influenza," by Herbert K. Detweiler, M.D. and W. Ray Hodge, M.D., *Jour. Exper. Med.*, January, 1924, xxxix, 1, p. 43-50. (4) "Scarlet Fever, Epidemiology, Immunology," by W. Ray Hodge, B.A., M.D., (Read for Dr. Hodge before the Section of Preventive Medicine and Hygiene Meeting, Academy of Medicine, November 27th, 1924). (5) "Recent Advances in our Knowledge of Scarlet Fever," by W. Ray Hodge, B.A., M.D., Tor. (To be published in *Can. Med. Assn. Jour*, January, 1925).

Dr. J. B. Black, long prominent in the medical circles of Nova Scotia and of the Dominion, died at his home in Windsor on the morning of December 9th, in the eighty-third year of his age. For several years he represented the county of Hants in the federal parliament, where he took the initiative in the introduction of legislation aimed at the establishment of a Dominion Department of Health. His interest in public health measures was very keen, and on many occasions on which he pled for their support, his addresses were characterized by careful preparation and eloquent and forceful presentation. Notwithstanding the demands of an extensive practice, his abounding energy found expression in many other activities. To the Payzant Memorial Hospital, at Windsor, he proved a warm friend and among the contributions which he made to that institution is the operating-room section. His warmth of heart, cordiality of manner and consistent friendliness endeared him to everyone. Some years ago he was unfortunate enough to lose his sight,

but while this required him to withdraw from practice it did not detract from his cheeriness nor from his enthusiasm over any new advance in medicine. On the occasion of the 1923 meeting of the Medical Society of Nova Scotia, he delivered an address in which he reviewed the progress of public health work in a masterly way, and until very recently he was a regular attendant of the local medical society, taking an active part in its proceedings. A characteristic of Dr. Black was his kindly interest in young people, by whom he was always welcomed as one of their "set." This interest was shown in the most unselfish way to younger members of the profession, who could always look to him for encouragement and assistance. He was always young in spirit and retained his physical and mental vigor until overtaken by the brief illness which caused his death. His loss is sincerely mourned, both by the profession which he ornamented and by all classes and creeds of the constituency he served so well. W. H. H.

Duncan Campbell. Dr. Duncan Campbell, who after retiring from the Army Medical Service, had practised at West Branch, Nova Scotia, for more than thirty years, died on November 17th at the age of seventy-eight. He had not been in good health for some time, but was able to continue his professional duties until within a few days of his death. While of a rather retiring disposition, he was an efficient practitioner and was greatly beloved by the country folk amongst whom he laboured with increasing devotion.

George Evastus DeWitt. The Nova Scotia profession has again been called upon to mourn the loss of one of its oldest and most esteemed members. Dr. George E. DeWitt died at his home at Wolfville on the evening of November 17th, in the eighty-third year of his age. He graduated at Harvard in 1842, and practiced first at Chester, then at Halifax, and since 1892 at Wolfville. Throughout his career he was a keen student and especially interested in preventive medicine. For ten years he was the medical health officer of Wolfville, serving with great efficiency in this capacity. He associated himself actively with the anti-tuberculosis movement, and was often called upon to address meetings in that behalf. His striking physique combined with the gift of clearly and forcibly presenting any subject which he undertook to discuss made him a welcomed advocate or a dreaded antagonist of any course. For three successive terms he served his town faithfully and well as its chief magistrate. He took a keen interest in fruit culture, and delighted to work in his large and well kept garden. But none of these interests interfered with his attachment to his profession. Few physicians were so regular as he in attendance at meetings of medical societies—local, provincial and federal. For some years it was his custom to spend the greater part of each winter in the sunny south, which doubtless assisted in the maintenance of the remarkable vigour, both physical and mental, which characterized Dr. DeWitt until he was stricken by the illness which caused his death. He will be much missed in all circles, but especially by his medical colleagues in whose hearts he held so warm a place. W. H. H.

Dr. B. D. Harrison a graduate of the old Toronto School of Medicine of 1882 died at Battle Creek early in December. Dr. Harrison was well known in Michigan for his crusades against fake medical schools and quack doctors, and had long occupied a prominent position as Secretary of the Michigan State Board. He had practised in Michigan since 1888 and from 1906 had been in Detroit. During the late war he served as captain in the United States reserve medical corp. His body was brought to Toronto for burial.

Dr. Harrison Howell died in Welland on November the 15th.

Dr. Arthur D. Patton died recently. He was an old resident of the city of Montreal and well-known practitioner. Dr. Patton whose death came after a lengthy illness, was prominently identified with the staff of the Homeopathic Hospital.

Dr. James A. Robertson.—One of the best known of the older members of the profession died in Stratford on November the 4th. A graduate of the old Toronto School of Medicine in 1871 he commenced practising in Tavistock moving later to Stratford. For forty years Dr. Robertson had been surgeon with the Grand Trunk Railway, and for almost half a century had held the important post of Medical Officer of Health for the city of Stratford. In 1902 and 1903 he was Vice-President of the College of Physicians and Surgeons of Ontario and in 1903 and 1904 he became President of that body. He is survived by his wife and by his son Dr. Lorne Robertson well known in the practice of medicine in the Stratford district.

Dr. John M. Standish one of the old practitioners of the province who had reached his eighty-fourth year died in Toronto early in November.

Dr. David Wallace a graduate of Queen's University in 1881 died in Kemptville on November the 19th. Dr. Wallace was a pioneer medical practitioner of the Ottawa valley, and had been a Liberal member for Russell in the Dominion House. Before moving to Kemptville he had practised for twenty-seven years in Metcalfe, Ontario.

Tuberculosis of the Tongue. — Howard Morrow and Hiram E. Miller, San Francisco, review the literature of tuberculosis of the tongue, and report sixteen cases. They conclude: Primary tuberculosis of the tongue seldom occurs. Secondary tuberculosis of the tongue is more common than statistics would lead us to believe: fourteen (1 per cent) cases in a total of 1,444 tuberculous patients. Biopsies of questionable tuberculous lesions of the tongue should not be taken. The entire lesion should be removed, or none at all. The best local treatment in their hands has been the surgical removal by a V-shaped incision of the solitary tuberculous lesion of the tongue.—*Jour. Am. Med. Ass.*, Nov. 8, 1924.

Association Notes

OUR members are hereby notified that the annual fee is no longer payable to the Honorary Treasurer of the Association, Dr. Bazin of Montreal, but to the General Secretary, Dr. T. C. Routley, 184 College St., Toronto. This change was decided by the Executive Committee as it will afford the General Secretary an opportunity of being more intimately acquainted with the standing of members individually, in districts and provinces. Sight drafts and accounts are now being issued and all correspondence pertaining to the annual fee should be addressed to Dr. Routley.

Annual Fee

The annual fee of $10.00 for the year 1925, becomes due and payable on January 1st. The Provincial Associations of Nova Scotia and Manitoba have kindly undertaken to collect the annual fee from our members in those provinces. Bank drafts are being drawn on other members, and may be presented before this notice comes to your attention. These drafts are issued primarily for the convenience of members, as it is only necessary for you to attach your signature in order to complete your membership for the year 1925. To each draft has been added the bank charge of 15c. This is a small item for each individual member, but, if this expense had to be borne by the Association, the amount in the aggregate would be a considerable loss to our general funds. It will be appreciated if members will honour their drafts promptly.

T. C. ROUTLEY
General Secretary

Medical News from the British Empire

GREAT BRITAIN

Sterilization of the Unfit.—Probably for the first time in the House of Commons, the Government was asked on October 2nd to investigate the advantages of sterilization of the unfit. The subject was raised by Mr. Black, who asked whether, in view of the continuously enlarging financial responsibilities accepted by the state with regard to unemployment, invalidity, and old age, he would state the policy of the Government with respect to the procreation of children who, owing to physical or mental deficiencies, became a charge upon the state funds; and whether he was prepared to appoint a Royal Commission to investigate the possibilities of improving the calibre of the nation by restricting the procreation of children to persons possessing a recognized minimum standard of physical and mental efficiency. Mr. Greenwood replied that the Minister of Health did not see his way to recommend the appointment of a Royal Commission on the question. In refusing the suggested Royal Commission, Mr. Greenwood added that the Minister of Health was not aware of the existence of any recognized standards of physical and mental efficiency.

The first session of the new Parliament opened on Tuesday, December 2nd, when Mr. J. H. Whitley was again elected Speaker. The King's speech will be delivered on the 9th, and after the Christmas adjournment the session will be resumed about February 10th. Before Christmas only the debate on the Address and urgent business will be taken. The new Minister of Health, Mr. Neville Chamberlain, is understood to be investigating the possibility of better co-ordination between public health services and health authorities. In view of the fact that the Royal Commission on National Health Insurance is not expected to complete its work for another year, there is no likelihood of the Government proposing during the session of 1925 any measure of "all-in national insurance."

The growth of co-operation in scientific research in Great Britain is indicated in some degree by the increased expenditure of public funds on this object. The Committee of the Privy Council for Scientific and Industrial Research in its last report* gives an estimated expenditure for 1924-25 of £328,281, as compared with £276,863 in 1923-24, and shows also that great progress has been made in organizing active intellectual co-operation in scientific matters between various State departments. The result will be that the Government will eventually have at its disposal a scientific staff capable not only of recognizing the significance of practical problems, but also of efficiently dealing with them. There is, however, a tendency to give fewer grants to the various research associations. It is felt that these should look more and more for their financial support to the industries which they represent. One industry, however, is working under rather exceptional circumstances, as regards the need of support, viz. the British Scientific Instruments Research Association; for the advance of science is so largely dependent on the continued improvement of scientific instruments, and the work of the association is also closely connected with problems in national defence. The aid given, however, is accompanied by suitable conditions of control.

Grants have been made, also, to individual research workers and students in training, and a comparison of the work done by these from year to year shows a steady improvement in standard. It is interesting, however, to find a note of warning as to the place of school history in the education of students: experience is showing that it is inadvisable to allow science to absorb the student's mind, during the last two years of his school life, to the exclusion of the humanities and other elements in his general education.

The report gives summaries of the work done by various research organizations. The Food Investigation Board, for example, sent a small expedition to Australia this year, to study the conditions of apple transport: they also continued investigations into the changes brought about in beef, mutton, and fish by freezing; notable differences occur in the tissues when frozen slowly, as compared with the results of rapid freezing. Work is also being done by a Dental Investigation Committee on the various alloys in dental amalgams, and vulcanizable rubber and substitute materials for dentures. An appendix to the report outlines the developments in the organization of research. H. E. M.

*H.M. Stationery Office, 1924. 3s. net.

INDIA

A recent letter from Lt.-Colonel R. H. Elliott criticizes the Government of the Madras Presidency for its policy of encouraging indigenous systems of medicine in that area. It appears that three years ago the Government of Madras appointed a committee to enquire into and report on the question of recognizing and encouraging these native systems. The *British Medical Journal* took up the matter and showed clearly that there could never be any question of western medicine requiring to draw upon the resources of such systems, for in our own medical history we could find exactly the same stages of theoretical and metaphysical dogma as exist in the Indian native systems of medicine to-day. They have not advanced beyond these.

It was pointed out also that the Government would do better to encourage the development of modern science by the aid of scientists and teachers trained in western science instead of trying to "stimulate belated indigenous systems into renewed activity."

Colonel Elliott now shows that this advice has fallen on unheeding ears, for it has been decided to constitute a Board who shall form an association of practitioners of the active systems, formulate details for a college of Indian native medicine in Madras and decide on the advisability of giving scholarships in certain institutions. To bring out the implications of such a plan Colonel Elliott refers briefly to the extremely primitive stage of development of these systems (chiefly the Ayurvedic and Unani). "Their physiology," he writes, "is that of the 'humours'; their pathology resembles that which was current in the time of Hippocrates;.....their views on drugs are primitive; they know nothing of their standardization, and rely rather on the phase of the moon under which the plants were gathered, or the dung of

the sacred cow, or virgin's urine, and on similar harmful trash....". He warns young medical men who may be thinking of enlisting in the service of the Indian Government, that it is with these antiquated and unscientific methods that he will find himself in association, and perhaps even he will be called on to aid in the support and continuance of such systems.

Colonel Elliott finds it hard to believe that the members of the Madras Government can really believe in such fantastic systems of medicine. He suggests that the Government has either yielded to Indian clamour and is acting contrary to its better judgment, or that as medicine is a transferred subject under an Indian minister the latter has the final decision on the subject.

On the other hand, a recent editorial in the *Indian Medical Gazette* makes a plea for certain aspects of these native systems of medicine. Granted the obvious and very grave defects which exist in them, they still remain the guide to about nine-tenths of the Indian population: the dietetics especially are based on Indian dietaries and meet the complex Indian requirements of caste and creed. There is room for criticism of western medical methods too, for it is held that often the medical man coming from Europe to practise in India is ill equipped by his western training to deal with the problems of tropical medicine.

A compromise is suggested by which each side will contribute to a system of medicine that will fully meet the requirements of the native: that "the Ayurved shall learn the anatomy, the physiology, the modern midwifery and the present-day experimental pharmacology of the western system; that the practitioner of the western system should study the dietaries, the methods of cultivation, the better known drugs and the special methods of treatment of the Ayurvedic system."

AUSTRALASIA

There are three medical schools in Australia, and they are attached to the Universities of Sydney, Melbourne and Adelaide. While they are relatively young schools, they have been built up by and reflect the labours of a group of distinguished medical men. In Melbourne and Sydney the course extends over five full years and two terms; in Adelaide, over six full years.

The fees for the total course vary from about $1000.00 in Melbourne to about $1500.00 in Sydney. We note that post-graduate work is arranged for in various centres together with special lectures and courses as occasion arises.

News Items

GENERAL

Within the last month there have been two conferences at Geneva, in connection with the traffic in opium and dangerous drugs. These conferences were summoned by the League of Nations, but seem to have been a little vague in their powers and purposes, for they included representatives of countries which are not members of the League, notably the United States. Nor did the various delegates possess full powers to act on behalf of their nations; in the case of Great Britain and India it was to be noted that only minor officials were present, and no medical member was included.

Disagreement arose between the Japanese, and British and Indian representatives, regarding the right to question the importing of dangerous drugs when their import certificates were not above suspicion but eventually some agreement "in principle" was reached. A more marked divergence in views was apparent between the representatives of America and of India. The American position was that if the purpose of the Hague Opium Conference was to be achieved in its true spirit, then it must be recognized that the use of opium products for other than medicinal or scientific purposes was an abuse not legitimate. And, further, their view was that it was necessary to so control the production of raw opium that there would be no surplus available for non-medicinal and non-scientific purposes.

The Indian delegates felt that these principles infringed sovereign rights as regards domestic production and commerce in raw opium, as well as affecting Government revenue. However, a vote taken later in the conference showed an overwhelming majority (26-1, nine abstaining) in favour of the American view that the conference should be allowed to freely examine the whole question of production of and traffic in the dangerous drugs included in the convention of 1912.

It may be recalled that this convention called for widespread curtailment in the production of opium in China and India and Persia, but it was also pointed out by those drafting the document that unless the countries producing the drugs were sincerely anxious to control them and to sacrifice the lucrative trade arising from their sale, it was idle to expect much to be done by conferences and committees. This comment is being completely justified, for in the various countries mentioned there is still a very large output of these drugs. The Indian Government exports large quantities to the Straits Settlements and Hong Kong, and China which was said to be free from cultivation of the poppy in 1914, is now one of the chief opium producing countries in the world. It is time then that the Hague Opium Convention be carried out in the spirit and letter of its articles, but it is clear that in this matter the various countries have some distance to go towards meeting on a common ground.

The Commission for the distribution of the prize for cancer study founded by Dr. Sofie A. Nordhoff-Jung, in agreement with the Foundress has resolved to distribute the prize from now on only every two years to the double amount of the sum allotted heretofore, that is one thousand ($1,000) dollars. The next prize will reach distribution in 1926.

From the Biological Department of the Georgetown University, W. Washington, D.C.

An international clinic of oto-rhino-laryngology and facio-maxillary surgery will be held at the St. Louis Hospital, Paris. The course of instruction in the former subject will be held from January 15th to May 15th and in the latter from May 15th to June

30th. "Ample clinical material, hospital and teaching facilities will be furnished by the hospitals of Paris. Lecturers of experience and established reputation will be invited from all over the world to complement the instruction of the Faculty." Any graduate licensed practitioner in good professional, ethical, and moral standing will be admitted for instruction. Fees payable in advance to the Secretary-Treasurer (Dr. Jeanne Gobreau, 120 Avenue Victor Hugo, Paris, xvi.) are five hundred dollars for the entire course, for the oto-rhino-laryngology course three hundred and fifty dollars, and for the course in facio-maxillary surgery two hundred and fifty dollars.

The Rockefeller Institute for Medical Research has announced the release of the drug known as Tryparsamide for use in the treatment of human and animal trypanosomiasis (African sleeping sickness and *mal de caderas*) and selected cases of syphilis of the central nervous system. This action is based on results reported from clinical investigations which have been in progress for several years. The drug will be manufactured by the Powers-Weightman-Rosengarten Co. of Philadelphia, and will become available through the regular trade channels about January 1, 1925. In releasing the drug for the benefit of the public, the Rockefeller Institute desires it to be known that the Institute does not share in any way in profits that may be derived from the sale of the drug and that, with the cordial co-operation of the manufacturers, provision has been made for the maintenance of a schedule of prices on as low a basis as possible.

We have received a note from the Royal Society of Medicine, London, stating that membership in the Fellowship of Medicine is open to all qualified medical practitioners. In co-operation with most of the London general and special hospitals the Fellowship has arranged post-graduate courses for the ensuing half-year in various departments of medical science. The initial subscription of 10s. entitles members to receive regularly the monthly Bulletin which sets forth in detail the course of post-graduate studies afforded in the various metropolitan hospitals. Membership entitles them to attendance at certain of the lectures. Special courses, however, in the various departments of medicine have been arranged for, at which instruction will be given by many of the leading physicians and surgeons of London. Detailed information regarding these courses, for which an extra fee is charged, may be obtained from the Secretary, 1 Wimpole Street, London, W.1., who will also supply the syllabus of each special course as it appears. Courses have been arranged in Cardiology, Neurology, Ophthalmology, Psychological Medicine, Urology, Diseases of Children, Dermatology, Gynaecology, Tropical Medicine, Venereal Disease, Disease of the Chest, Infectious Fevers, Proctology and Diseases of the Throat, Nose and Ear.

The American Board of Otolaryngology was organized in Chicago on November 10th. Dr. H. P. Mosher was elected President; F. R. Spencer, Vice-President and H. W. Loeb, Secretary-Treasurer. The Board comprises representatives of the five American otolaryngologic associations. The object of the association is to elevate the standard of otolaryngology, to familiarize the public with its aims and ideals, to protect the public against unqualified practitioners, to receive applications for examination in otolaryngology, to conduct examinations of such applicants, to issue certificates of qualification in otolaryngology and to perform such duties as will advance the cause of otolaryngology. The first examination will be held at the time of the meeting of the American Medical Association.

NOVA SCOTIA

At the morning service at the historic St. Paul's Church, Halifax, on the 16th of November, a ceremony of unusual interest took place, when a bronze tablet to the memory of the late Senator Almon and his wife was unveiled by the Lieutenant-Governor of Nova Scotia. The service of dedication was taken by Ven. Rev. Archdeacon Vroom. The Lieutenant-Governor was escorted to the unveiling by the Church Wardens, bearing their wands of office, and by the Chief Justice of Nova Scotia and Colonel W. B. Almon, a grandson of the late Senator. The tablet is inscribed as follows:

> "To the Glory of God, and in loving memory of William Johnston Almon, M.D., Senator of Canada, son of the Hon. William Bruce Almon, M.D., born January 27th, 1816; died February 18th, 1901; and of his wife, Elizabeth Lichenstein, daughter of Mr. Justice Ritchie, of Annapolis Royal; born October 1st, 1817; died 30th June, 1896. The just shall live forevermore. And their reward is with the Lord. And the care of them is with the Most High."

At a recent meeting of the Provincial Medical Board, Dr. J. G. McDougall and Dr. E. V. Hogan, of Halifax, were appointed to represent the medical profession of Nova Scotia on the Medical Council of Canada. The Medical Faculty of Dalhousie University have elected their Dean, Dr. John Stewart, to represent the University on the Council.

The Halifax branch of the Medical Society of Nova Scotia met on November 12th to hear Dr. Murdoch Chisholm speak on some therapeutic measures he has found useful. As would be expected, there was a large attendance to hear Dr. Chisholm, who enjoys the affectionate esteem of all his colleagues, and who is noted for his originality of thought, his acumen in diagnosis, and his success in treatment. On the 26th of November, the Society began a discussion of haemorrhage, papers being read by Dr. Carney and Dr. Cunningham, dealing with "medical" and "nose and throat" haemorrhages respectively. The papers were admirably prepared and the subsequent discussion was participated in by a large number of the members. On the 10th of December, the subject will be continued with papers by Dr. Mack, Dr. Alan Curry and Dr. Mader on "genito-urinary", "general surgical" and "gynaecological" haemorrhages.

A meeting of the Osler Medical History Club of Halifax was held on the 9th of November at the residence of Dr. Weatherbe, when the host of the evening read an exceedingly interesting paper on James Syme.

A summary of the vital statistics of Nova Scotia for the month of July, recently issued by the Department of the Public Health, shows 986 births and 485 deaths for the month. The infant mortality rate for the month was 87.5. A comparison of ten months of the fiscal year with the corresponding ten months of last year shows that the number of deaths from tuberculosis is almost identical in the two periods, and the question is raised—has the decline in tuberculosis losses been arrested? For ten years there was a consistent decline in the death rate from tuberculosis, but the indications are that for the current year the rate will be little if any better than that of last

year. The Department of the Public Health is endeavouring to arrange a more complete programme for combating tuberculosis, and a proposed plan is being laid before the several medical societies of the province.

Dr. S. Keshan, of Halifax, Dr. R. F. MacDonald, of Antigonish, Dr. F. E. Boudreau, of Amherst, and Dr. A. Calder, of Sydney, are taking post-graduate courses in Europe. Dr. C. K. Fuller, of Yarmouth, has recently returned from abroad, where he pursued post-graduate studies.

We desire to acknowledge receipt of the Bulletin of the Medical Society of Nova Scotia for November, and congratuate the Society upon its interesting character, full of personal news and useful reading. It contains an excellent account of the various district meetings in the province. We are particularly pleased to note that similar bulletins are being published in nearly every province of our Dominion and supply much personal matter which to our regret we are unable to obtain for our *Journal* in time to make interesting reading for our subscribers.

The Pictou County branch of the Medical Society of Nova Scotia celebrated the sixtieth anniversary of its organization by tendering a complimentary dinner to one of its first secretaries, Dr. John Stewart, who began his practice of medicine in the town of Pictou. Nearly every practitioner in the county was present for the purpose stated by the President, Dr. Clarence Miller: "To pay a tribute of love and esteem to the most loved member of the profession in Nova Scotia, Col. John Stewart, M.B., C.B.E." Dr. John W. MacKay read an illuminated address, signed by all the members of the Society, testifying to their regard for Dr. Stewart as a citizen, as a soldier and as a leader in the profession. He was followed by Dr. E. Kennedy who, in fitting words, presented Dr. Stewart with a gold watch engraved to mark the occasion. On rising to acknowledge the honours done him, Dr. Stewart was accorded an ovation. With that kindliness which is so characteristic of him, he thanked the Society for the distinction, referred to those with whom he had been associated professionally during the fifteen years he resided in Pictou, touched upon his experiences as a student of Lister's, and spoke of the opportunities for service in the practice of medicine. He concluded his address by quoting:

"Forth in Thy name, O Lord, I go,
My daily labour to pursue;
Thee, only Thee, resolved to know,
In all I think and speak and do."

Besides the medical men present, there were many distinguished laymen, of whom several vied with the Aesculapians in their expression of admiration of the guest of the day.

It was found impracticable to carry out the original plan relative to district meetings under the auspices of the Canadian Medical Association, but meetings were held at New Glasgow, on October 23rd, and at Sydney, on October 24th. Dr. A. T. Bazin, of Montreal, and Dr. George S. Young and Dr. T. C. Routley, of Toronto, represented the federal association at the first of these meetings, and were accompanied by Dr. S. L. Walker, the Associate Secretary of the Medical Society of Nova Scotia and Dr. H. A. Chisholm, of the Provincial Department of Health. Unfortunately Dr. Routley was summoned home from New Glasgow on account of the serious illness of his daughter, and was therefore unable to go to Sydney. At both meetings the attendance was large and much interest was manifested. Excellent addresses were given on medical and surgical topics, and the matter of organization received careful attention. The opinion was freely expressed that the idea of these district meetings is distinctly worth while, and that much good would be accomplished by establishing them on a regular basis.

QUEBEC

The Royal Edward Institute have been given possession of $15,000 by the will of Mrs. Greenfield-Horton; they have also received an anonymous donation of $25,000 for the erection of a school near the present Institute on Belmont Park.

Hon. Dr. H. S. Beland, Canadian Minister of Health, has been chosen president of the first subcommission of the Anti-Drug Conference. It will deal with the limiting of the manufacture of narcotics.

Dr. C. F. Martin has been elected president of the Canadian National Mental Hygiene Association.

Dr. J. A. Baudouin has been appointed assistant managing director of the Anti-Tuberculosis and Health League. Dr. Baudouin will have charge of the work among the French-speaking community.

Preparation for group instruction for women on the subject of health in the home was going ahead, and classes would soon be started. There was activity in other directions as well, Dr. Fleming himself was making a personal survey of health conditions, particularly in connection with the milk supply, so that first-hand information might be obtained. This was being carried on through the courtesy and with the assistance of the Health Department.

Work has been started upon the building of the New Maternity Hospital which is to be added to the Royal Victoria Hospital. It is to contain 200 beds and will be one of the most modern structures of its kind in America.

$255,406.59 was the amount contributed to the St. Mary's Hospital Campaign, for which the hospital extends grateful thanks to the workers.

The Board of Governors of the Alexandra Hospital, through its officers, the president, the honorary treasurer, Charles R. Hosmer, Esq., and its medical superintendent have, in connection with the officers of the St. Paul's Hospital for Infectious Diseases, brought the urgent requirements of these civic hospitals for a larger income before the Executive Committee of the City Council and a new arrangement has been reached. Beginning with January 1st, 1924, the institution will receive $35,000 a year, payable quarterly for the first thirty-five patients and $2.50 a day for each patient over this number. This arrangement will still leave a deficit of $10,000 in the case of the Alexandra Hospital for which appeal will be made to the public.

Complying with a request made to the Government to open an anti-tuberculosis dispensary in Verdun, Dr. J. A. Lessard, Director of Hygiene of this Province announced this morning that the necessary arrangements were now being made. The Municipal Council have also voted a preliminary sum of $1,500, which will be utilized in connection with its operation. A

sanatorium will also be installed in January in St. Jerome, Terrebonne County. Four new dispensaries will thus be opened in the district of Montreal within the next few months.

The importance of preventive measures in public health work was stressed by Dr. A. Grant Fleming, Director of the newly formed Anti-Tuberculosis and General Health League in his address to a meeting of the Child Welfare Association. The general death rate in Montreal as well as the infant mortality rate came in for some criticism from Dr. Fleming. The high rate of deaths from diphtheria, Dr. Fleming said, is due to lack of knowledge on the part of the public as this disease is both preventable and curable. Measles and whooping cough he regarded as serious owing to their complications and sequelae. Dr. Fleming paid a tribute to the splendid part which is being played by the Child Welfare Association in reducing the infant death rate, through its nutritional instruction and home visiting.

At a meeting of the Canadian National Committee for Mental Hygiene, held in the Ritz-Carlton Hotel recently, which was presided over by Lady Byng, it was decided to expend the sum of $150,000 on research work in mental hygiene.

The report of the Faculty of Medicine of McGill University, submitted by Dr. C. F. Martin, Dean of the Faculty, announced that a special post-graduate instruction course lasting four weeks, would be given in the month of April. While this course would be given chiefly in clinical subjects, it was intended that teachers should present the more scientific, modern aspects of their subjects, to graduates in order that they might take note of the more reecnt advances in medicine. Concerning the Department of Hygiene, Dr. Martin stated that radical changes were necessary to bring this department up to a state of efficiency equivalent to that of most of the other departments in the medical faculty, while in the Department of Psychiatry more clinical opportunities were necessary both for the students and for the staff. Without psychiatric wards attached to the general hospitals it was impossible to do justice to this subject, and it was hoped that in the near future something might be done to relieve this unsatisfactory situation. G. H.

In the Faculty of Medicine of McGill University the following numbers of students have registered for the session of 1924-25.

First year	94
Second "	95
Third "	107
Fourth "	104
Fifth "	90
Total	490

ONTARIO

The Harvey Club of London, Ontario, met on November the 21st, Dr. Harvey Thompson detailing his trip to Europe.

On October 21st, at a meeting of the Welland County Medical Society, Dr. Geo. E. Wilson of Toronto gave an address on "Fractures."

Dr. E. A. Morgan addressed the Simcoe County Medical Society at Alliston on October 21st, his subject being, "Some common errors in the diagnosis of acute conditions in infancy."

The Sudbury Medical Society met in Sudbury on October 22nd, Dr. C. L. Starr gave an address on "Acute arthritis and osteomyelitis."

At a meeting of the Perth County Medical Society at Stratford on October 23rd, Dr. I. H. Erb gave an address on "Infections with haemolytic streptococci in children."

On October 24th, at a meeting of the Peterborough Medical Society, Dr. W. R. Campbell of Toronto gave an address on "Methods for the study of renal function and their value in the diagnosis of renal disease."

Dr. E. J. Trow addressed the Sault Ste. Marie Medical Society on October 24th, his subject being, "The diagnosis and treatment of the common skin affections."

The Lincoln County Medical Society met at St. Catharines on October 28th, Dr. J. R. McCabe of Strathroy gave an address on "Practical demonstration of difficult presentations in obstetrics."

At a meeting of the St. Thomas Medical Society on November 7th, Dr. P. G. Goldsmith gave an address on "The care of discharging ears in children."

Dr. N. B. Gwyn, of Toronto, addressed the Haldimand County Medical Society on November the 14th at Cayuga, taking as his subject "The diagnosis and treatment of pneumonia and empyema."

At a meeting of the York County Medical Society held at the home of Dr. C. D. Farquharson at Agincourt, on October 30th, Dr. E. A. Morgan gave an address on "Some common errors in the diagnosis of acute conditions in infancy."

On October 30th, at a meeting of the Perth County Medical Society at Stratford, Dr. G. S. Glassco gave an address on "The intimate relationship observed in the neuroses and psychoneuroses of the mind, the sympathetic nervous system, and the endocrine glands."

Dr. V. E. Henderson of the Department of Pharmacology, University of Toronto, addressed the Perth County Medical Society at Stratford on November 6th, his subject being, "The action of drugs on the uterus."

The Victoria County Medical Society met at Lindsay on November 7th. Dr. E. Stanley Ryerson, of Toronto, gave an address on "The pathology of the gallbladder and bile ducts, and its relation to the clinical manifestations of disease and the surgical treatment indicated."

Abstract number twenty-five dealing with social hygiene and venereal disease compiled by J. J. Heagerty, chief of the division of venereal diseases control contains many interesting references to the clinical signs and symptoms of syphilis such as fever, pain with aortic disease, the acquiring of syphilis by a congenital syphilitic, and contains much that is of interest to state medicine.

"Visions of the Ghost of Malthus" is the interesting title of the contents of the monthly health bulletin issued by the Department of Public Health in Toronto.

It represents an interesting collection of the views of many great thinkers on this startling subject, concluding with the statement that even Dean Inge believes that birth control is an essential part of eugenics and at the same time an essential part of Christian morality.

The flaming red pamphlet on "Smallpox and vaccination", a popular treatise by J. J. Heagerty issued by the Department of Health at Ottawa, contains enough excellent prints to make its perusal well worth while. Dr. Heagerty has collected much that is interesting in the history of smallpox and vaccination, and has put it forth in a very attractive form. He has searched the early records of Canada and gives us what we long wished to know, some of the details of the early epidemics under the French and English occupancy. Some of the more recent Canadian epidemics are described, and the horrors of the 1885 outbreak well pictured. The present day methods used in combating the disease and the history of vaccination is included in the pamphlet.

The annual meeting of District Number 7 of the Ontario Medical Association, comprising the Counties of Frontenac, Leeds, Grenville, Lanark, Lennox and Addington, was held at Kingston on Friday, October 17th, 1924. Commencing at ten o'clock in the forenoon, a "clinical morning" was held at the General Hospital, many interesting cases with x-ray pictures were exhibited. A particularly valuable contribution was submitted by Dr. C. M. B. Cornell of Brockville on "The etiology of pernicious anaemia and its connection with chronic infection by bacillus Welchii." The paper was very well received by the large audience present, and stimulated a good discussion. Luncheon was served at the Cataraqui golf club, sixty members sitting down. The presidential address was delivered by Dr. George S. Young of Toronto. and the executive address by Dr. T. C. Routley, the Secretary of the Association. Immediately afterwards the meeting adjourned to witness the laying of the foundation stone of the new clinical wing of the hospital, by the Premier, the Honourable Mr. Ferguson. At the same time, Mrs. H. Richardson laid the corner stone of the new pathological building which is placed as a "T" across the end of the clinic. After these ceremonies, and after a rather hurried inspection of the new library at Queen's University, the special lecture of the day, "Some modern aids to labour", was delivered by Dr. W. B. Hendry of Toronto, and much appreciated by the members and by the students of Queen's Medical School.

In the evening, the autumn convocation was held at Queen's University, Sir Robert Borden was installed as chancellor and delivered his historic speech upon the Versailles treaty. This was followed by an address by the Honourable Mr. Ferguson, Premier of Ontario.

The Annual Meeting of the York County Medical Association was held at the home of Dr. G. W. Williams, Aurora, on the afternoon of Thursday, December 18th. The following officers were elected for 1925. President, Dr. G. W. Williams, Aurora; Vice-President, Dr. S. W. Otton, Newmarket; Secretary, Dr. W. A. Sangster, Stouffville; Treasurer, Dr. H. B. Freel, Stouffville. Advisory Committee, Dr. C. P. Johns, Thornhill; Dr. F. A. Dales, Stouffville, and Dr. R. L. Langstaff, Richmond Hill. Dr. Fred Hipwell of the Diabetic Clinic at the Toronto Western Hospital read a paper on "The Care and Treatment of the Diabetic Patient." S. W. OTTON

District number eight of the Ontario Medical Association, comprising the counties of Carlton, Russell, Prescott, Glengarry, Stormont, Dundas and Renfrew, met at Ottawa on Friday, November the 21st. An interesting programme which occupied the whole day was presented, the opening of the new Ottawa Civic Hospital attracting a large number of physicians from the outlying districts. Clinics at St. Luke's and the Salvation Army Hospital began in the morning, and at 10.30 the first clinic in the new hospital was given by Dr. J. R. Goodall, of Montreal, "Eclampsia" being the subject discussed.. French Canada was represented in the next address "The diagnostic value of x-ray to the general practitioner," by Dr. Leo E. Pariseau, of the Hotel Dieu, Montreal. At 1 p.m. the great hospital was thrown open and a complimentary luncheon was given to several hundred people. A clinic on "Lesions of the gastro-intestinal tract" was given in the afternoon session by Dr. George Strathy, of Toronto, after which there was a tour of inspection of the hospital. An informal dinner in the evening at the Chateau Laurier at which short addresses given by Dr. George S. Young, President of the Ontario Medical Association, and Dr. T. C. Routley, the Secretary, Concluded the day's programme. N. B. G.

ALBERTA

Dr. E. L. Pope, Professor of Medicine, in the University of Alberta, delivered an instructive address on December 2nd, to the members of the Calgary Medical Society, on the subject of "On the Importance of Second Thought in the Management of Some Common Maladies."

Dr. T. H. Crawford, who, as a member of the last City Council, gave much valuable service in connection with Calgary's municipal hospitals administration, has been re-elected by a large majority for a further term of office.

The question of the revival of "Free Clinics" in connection with Calgary's School Board, which was made an issue of prime importance in the recent civic elections was decisively decided by the return to office of a majority of candidates who were against the renewal of this measure.

BRITISH COLUMBIA

The Health Bureau of the Board of Trade received an address from Dr. W. A. Dobson of this city, on the 5th of November, dealing with "Some Aspects of Psycho-therapy From a Community Point of View". At the next meeting, held on November 19th, Dr. W. B. Burnett spoke on "The Teaching of Sex Hygiene in Schools." In dealing with this question, it is of the greatest importance that this vital subject be approached in the proper way, so that a wide and comprehensive understanding, from a biological standpoint, be inculcated in the child's mind, rather than specific references to the problems of sex, the teaching of

which would be extremely difficult, if treated as a separate subject. Some years ago, the Vancouver Medical Association appointed a committee to consider this subject, under the able chairmanship of Dr. Brodie, and this committee came to the conclusion that biology should be taught in a carefully graded series of lessons, rather than that the sex problem should be dealt with as such.

At the December meeting of the Victoria Medical Society it was unanimously decided to extend an invitation to the Canadian Medical Association to hold its annual meeting in Victoria, in 1926. Should this invitation be accepted every possible effort will be made to ensure its success.

A close watch has been kept by the Legislative Committee, on certain Bills now before the Private Bills Committee in the Legislature. Dr. M. J. Keys, of Victoria, (Chairman of our Legislative Committee) has spared no effort to guard the interests of the public and the profession in this connection.

The second luncheon of the B. C. Medical Association was held at the Ambassador Cafe, on the 14th of November, with Dr. W. B. Burnett, Vice-President, in the chair. The speaker of the day was Dean H. T. J. Coleman, M.A., Ph.D. Dean Coleman gave a very thoughtful and interesting address on "Experimental Education." Dean Coleman is always a delightful speaker, and has the gift of suggestiveness. We consider ourselves fortunate that we were able to secure him for the luncheon. The orchestra of the Vancouver Medical Association played several numbers, which were very helpful in enlivening the proceedings.

The regular monthly meeting of the Vancouver Medical Association was held in the Normal School auditorium on Tuesday, December 2nd. Dr. G. A. Lamont, who recently returned to the city after visits to important paediatric centres in the eastern States and Canada, gave a very interesting and instructive paper on "The Early Weaned Infant." The paper was discussed by Dr. C. F. Covernton and Dr. H. A. Spohn.

The clinical section of the Vancouver Medical Association met on November 18th at the Vancouver General Hospital, when cases of basal meningitis, papulo-necrotic tuberculide, and jejunal ulcer were shown and discussed. A new aspiration apparatus was also demonstrated by Dr. Dan. McLellan.

The friends of Dr. Edwin J. Brouse will be sorry to learn that he met with a severe accident recently while leaving his office in the Birks Building, Vancouver. He is at present in the Vancouver General Hospital where he is making good progress towards recovery.

Dr. W. D. Keith left Vancouver in the middle of November for a trip to the east. He is at present in Rochester with his brother Dr. Norman Keith who is attached to the Mayo Foundation for medical research as Associate Professor of Medicine.

Dr. Saul Bonnell, late of Fernie, B.C., Dr. T. F. Saunders, Dr. R. E. Page,, and Dr. F. C. Bell are recently elected members of the Vancouver Medical Association.

A meeting of the local members of the Executive of the B. C. Medical Association was held on December 2nd, when several important matters, were dealt with. At this meeting Dr. A. W. Bagnall, (chairman of the Committee appointed to go into the question of a Benevolent Fund) reported progress, and suggested the possibility of starting such a fund by earmarking a percentage of all membership fee collections for that purpose, subject, of course, to the approval of the full executive and endorsation by the association.

Dr. J. A. Gillespie reported on the Health Insurance Committee's work and was congratulated on his statement. It is hoped that arrangements can be made for the inclusion of this report in the next issue of the Vancouver Medical Association's bulletin.

Dr. Wallace Wilson (Chairman of the Publicity and Educational Committee) gave a very interesting account of the work done by his committee. He explained that in addition to much valuable literature having been wisely distributed in doctors' waiting rooms, satisfactory arrangements had been made with the "Province" newspaper for the publication of medical health articles, *daily*.

The Vancouver Medical Association is to be congratulated on its bright, pithy, and useful monthly bulletin. Quite a number of out-of-town medical men have expressed their appreciation of this publication which gives them news of general interest which they would not otherwise get.

Dr. J. H. MacDermot, Secretary-Treasurer of the B. C. Medical Association, will represent this Association at the forthcoming conference between the Canadian Medical Association and the Dominion Government on the Medical Services, to be held in Ottawa on December 18th, 19th and 20th, when matters of the greatest importance, peculiarly affecting the medical profession, will be dealt with. Dr. H. E. Young, of Victoria, will represent the Provincial Government, at this meeting, and Dr. E. D. Carder, the College of Physicians and Surgeons.

It is hoped that on their return, these gentlemen may give to the Victoria and Vancouver Medical Societies, a full report on the matters dealt with.

Dr. A. W. Montague, late of Minnedosa, Manitoba, for several years associated with the Minnedosa Clinic as eye, ear, nose and throat specialist, has opened offices in Victoria, B.C., at 201-2 Sayward Building.

Dr. W. M. Carr, late of Winnipeg General Hospital, is director of radiology at the Royal Jubilee Hospital, Victoria.

Dr. J. J. Mason, of Vancouver, addressed the Victoria Medical Society last month, his subject, "Abdominal Hysterotomy" proving to be full of interest and evoked a lively discussion.

Dr. George Hall of Victoria, has just returned from Europe where he visited some of the clinics. While in England, Dr. Hall saw Wembley Exhibition at close range. London is still a good place to spend a fortnight's leave.

Dr. J. M. Fowler and Mrs. Fowler, of Victoria, are spending Christmas at his mother's home in Petrolea, Ontario.

Dr. Forrest Leeder of Victoria, presented a most instructive paper to the Victoria Medical Society at the December meeting. The subject "Insomnia" was rendered most interesting by the facile pen and artistic presentation of Dr. Leeder.

Book Reviews

An Outline of Endocrinology. By W. M. Crofton, B.A., M.D. 126 pages, illustrated. Published by E. & S. Livingstone, Edinburgh. Canadian Agents—The Macmillan Company of Canada, Limited, Toronto.

In the preface to this work the author states that because of the recent rapid advance in endocrinology it is inevitable that his book should be partly out of date at the time of its publication. Unfortunately this is very true and the reader, who has followed the current literature, is constantly reminded of the fact by the absence of references to important new work. It is the reviewer's opinion that the author has recommended glandular therapy for many conditions which are not treated in that way by the great majority of competent clinicians. It can be stated that it is very doubtful whether the pancreatic preparations which the author recommends for the treatment of diabetes mellitus contain the internal secretion of the pancreas. The author states that certain of these preparations, which can be administered by mouth, are effectual in combatting diabetes. Authorities in this subject, the world over, are unanimous in reporting that the active antidiabetic principle has not as yet been successfully administered *per os*. Other examples of the author's ultra optimism with respect to the beneficial efforts of glandular substances may be found in his chapter on the effects of the testicular extracts. C. H. B.

Applied Pathology in Diseases of the Nose, Throat and Ear. By Joseph C. Beck, M.D., F.A.C.S., Associate Professor Laryngology, Rhinology ,and Otology, University of Illinois College of Medicine; Chief of Staff, Oto-Laryngology, North Chicago Hospital, Chicago. 274 pages with 268 illustrations including 4 colour plates. Cloth $8.50 net. St. Louis: C. V. Mosby Company, 1923.

The text of this most profusely illustrated book is divided into two parts. Part one deals with acute diseases and part two with chronic diseases. In the former are six chapters dealing with the nose, pharynx, meso-pharynx, larynx, trachea, and ear, followed by one on acute complications of mastoiditis. In the second part there are five chapters on the nose, naso-pharynx and oropharynx, larynx, trachea, bronchi, and oesophagus, and the ear.

The author states in his foreword: "It is my deside to limit this work almost exclusively to my personal experiences and therefore it should not be considered as a text-book. There will be many subjects that will not appear either because I have had no personal experience pertaining thereto, or because I cannot offer any data as to their pathology."

A careful perusal of this book shows that this very frank avowal has not been over stated, for it is essentially a book of personal experiences. As such it is necessarily incomplete.

This criticism applies equally to the diseases dealt with, the description of the pathology and the illustrations. It is neither a text-book nor an atlas. It would have been better entitled, "Certain observations on the pathology of and its application to some of the diseases of the Nose, Throat and Ear, profusely illustrated." D. E. S. W.

Diseases of the Nose, Throat and Ear for Practitioners and Students. Edited by A. Logan Turner, M.D., F.R.C.S., Ed., with the collaboration of J. S. Fraser, M.B., F.R.C.S., Ed., W. T. Gardiner, M.C., M.B., F.R.C.S., Ed., J. D. Lithgow, M.B., F.R.C.S., Ed., G. Ewart Martin, M.B., F.R.C.S., Ed., and Douglas Guthrie, M.D., F.R.C.S., Ed. With 222 illustrations in the text and 12 plates, of which 8 are in colors. Bristol, John Wright & Sons, Limited. Canadian Agents, The Macmillan Co., Toronto. Price $2.50.

The Royal Infirmary of Edinburgh has taken a leading part in the elucidation of the various problems confronting workers in the department of diseases of the nose, throat and ear. For many years this work has been under the immediate direction of Dr. Logan Turner and it is fitting that a book developed from the practice of the staff of his hospital, should be produced under his name.

Oto-laryngology written for the general practitioner and for senior students generally fails to give all the important details of the anatomy of the various regions with which they deal, with the result that this very important feature has to be sought elsewhere, and perhaps not easily found.

In this work the anatomy is fully and satisfactorily given and this section will be found of great value, especially to those who have the responsibility of teaching the subject in medical schools. The illustrations are numerous and well chosen, and add greatly to the easy understanding of the text.

The section on diseases of the ear is written by Dr. J. S. Fraser, and is quite up to the standard one would expect from so sound an aurist. Most authors illustrate their pathology with a few plates from some other work, but Fraser gives his own and nowhere will better be found. There is not in the English language any better exposition of sound otology than is found in this book. Very good judgment has been shown in limiting the description of bronchoscopy and oesophagoscopy.

The book throughout is based on sound conservative experience. It may appear to stretch this conservatism a little, however, when one reads the operative procedures advised for chronic ethmoidal inflammation.

This book is likely to reach a high degree of popularity in the medical profession. It aims to be helpful to the senior student and general practitioner. The reviewer has already had ample evidence that this has been abundantly achieved. P. G.

History of the Great War Based on Official Documents. Medical Services, General History. Vol. III. Medical Services during the operations on the Western Front in 1916, 1917 and 1918; in Italy; and in Egypt and Palestine. By Major-General Sir W. G. Macpherson, K.C.M.G., C.B., LL.D. Pages viii + 556 with 145 sketch maps, charts, diagrams and photographs. Price £1 1s 0d. London, H. M. Stationery Office, 1924.

This volume of the official history of the Medical Services during the Great War continues the narrative to the end of 1918 and covers the operations in various fronts. Owing to the limited space available, the account is not as full as one would like, but it is admirable as far as it goes. It would be impossible to further compress the facts without leaving out essential features. The work of the medical services in the years 1917 and 1918 had become highly complex, and the organization to meet it had been greatly enlarged. The change from position warfare which had existed on the western front for over two years changed to a war of movement, first as a retreat during the German offensive of 1918, then as an advance during the march to victory. The problems presenting themselves

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were very different from those of 1915-16, but they were solved in a most satisfactory manner.

The volume includes an account of the British medical services with the French on the Aisne and the Marne, May to August, 1918; with the British forces in Italy; the medical services in Egypt; the medical services during the operations against the followers of the Senussi and Sultan of Darfur; the medical services during the operations in the Sinai peninsula; the medical services during the operations in Palestine. Perhaps the most interesting chapter is that dealing with the Holy Land campaign. This chapter deals with the operations from the time when General Sir E. Allenby took over command of the Egyptian Expeditionary Force on the 28th of June, 1917 up to the conclusion of active operations in the end of October, 1918. It is a very full account of about fifty pages accompanied by seven maps and a number of illustrations. The arrangement of the material and tables is clear, the description concise and exact and the narrative sufficiently imaginative to enable the medical operations of the most successful campaign of the war to be followed with undiminished interest. Statistical details regarding the medical units with the British Expeditionary Force in Egypt and Palestine are given in Appendix A. 3. During the sixteen months of this campaign the British force advanced against a well entrenched and well prepared enemy, drove him successfully from the first, second, and third defensive position of great strength, completely routed and captured his entire force and equipment, effected its result with a minimum loss, and completely established British prestige in the eastern coast of the Mediterranean from Egypt as far north as Asia Minor. There was no point in which the victory was not complete and overwhelming. The physical difficulties were immense. The campaign started on the sands of a desert, was continued into an excessively rough, mountainous, roadless country, then over dry rolling country, and finally wound up with a spurt of speed through a mixed type of country of mountains and plains intersected by a few good roads and railroads. Each section of the advance involved a new long irregular line of communication. The campaign proceeded through great extremes of weather. The highest type of organization of all services was consequently demanded to meet the changes which were abrupt and sudden and had to be met at the highest speed. It would be hard to imagine a campaign which could put more strain and stress on the medical services. Other campaigns of the war demanded great exertion on the part of these services, but they were demands of quantity rather than of quality. This one abounded in difficulties of the most extreme type, and one who was through the campaign is able to bear testimony that the medical services were elastic, speedy and efficient, and rose heroically, and most adequately to the duties demanded so that he knows of no point in which they were in the least defective.

The account commences with a brief outline of the entire campaign, while the remainder of the chapter is occupied with a description of the medical situation during the operations. The latter is considered in three sections; first, the pictures of the battles of Beersheba and Gaza and the subsequent pursuit to Jaffa and Jerusalem, or the period from the commencement of the operations in October, 1917 to the end of the year; second, the period of small advances and the operation in Trans-Jordania during 1918 up to the final battle, the third, the period commencing with the final battle on the 19th September and ending with the armistice on the 31st of October, 1918. No detail requisite for study by medical officers seems to be lacking. The student of military services should examine the context most carefully with constant attention to two points which deserve mention. In the first place if he has not seen Palestine he should before taking up the intensive study of the chapter obtain access to as many of the official photographs of the campaign in this difficult country as possible. The photographs which illustrate this chapter are of very little aid; they do not contribute to the intelligent appreciation of the difficulties and the way the difficulties were surmounted in the least. He should get photographs of the desert which fringes Gaza and Beersheba; of the plains of Sharon; of the hill country of Judea; of the steep, almost impassable wadis leading to the Jordan, etc. He should study the dry and wet season changes in these. He should have photographs of the chicken wire roads which were made in the desert in the twinkling of an eye for trains of Ford ambulances. He should see how the light, broad wheeled sand carts were most efficient in the desert and almost over night became useless junk in the impossible hill country. He should have pictures showing how field ambulances changed from standard equipment to desert equipment, and then from desert equipment to mountain equipment, and then from mountain equipment back to standard equipment; and photographs alone will convey to his mind the rapidity with which the changes had to be made and the difficulties with which the officers and personnel had to contend. The second point is that here and there in the chapter there occur sentences which are accurate, not merely "as dry as dust," but written with imagination. These sentences are full of meaning and should be read and re-read most carefully. A few of them may be given as examples:—One paragraph reads, "It was important to avoid disclosing the fact that Imara was being prepared as a large hospital centre. Consequently the three casualty stations had to pitch their tents and instal 3,000 beds during the night of 30-31st October. This they accomplished in twelve hours, just one hour before the wounded began to arrive. Tent pitching and preparation of beds had been thoroughly practiced beforehand at Rafa, and 600 Egyptian Labour Corps were attached temporarily to each casualty clearing station to assist in getting it ready." Now Imara was nothing but a spot in the desert some fifteen miles from Rafa. It was in full sight of the enemy position. Up to a few days before the battle there was no indication in the desert that the force which was then on the sea coast was going to proceed in this direction. Another paragraph reads: "The difficulties of a long line of evacuation over indifferent roads now began to be apparent, the more so as the two advancing divisions were proceeding along divergent roads with no cross communications." Still another: "The difficulties of evacuation of the sick and wounded after the advance to Jaffa were very great." "Rain upset everything. Railroads were washed out and road bridges destroyed. The roads were impassable for wheeled transport and passable for camels only after the boulders were removed. The less serious cases were brought down by camel or on mules, and the more serious were man-handled over five miles." Sentences such as the above indicate that the difficulties were immense at all times and demanded the greatest ingenuity to overcome and should therefore be read and re-read until the imagination has shown how the medical services adapted themselves to almost insurmountable difficulties of evacuation, transportation and sanitation. Great as were the difficulties, they were adequately met and there was no dissatisfaction in the force over the medical arrangements. All ranks appreciated that the medical services were adequate, efficient, adaptable, and speedy, and this feeling undoubtedly did much to produce that general sense of confidence and content with the working of the Staff which is most desirable and almost indispensable for the complete success of the campaign. The medical services may be proud of their record during the operations in Palestine.

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This volume also contains a large number of sketch maps, photographs, diagrams, etc., as well as valuable statistical appendices, and is one more testimony to the untiring energy of its talented author and editor. J. H. E.

Human Physiology. By C. G. Douglas, C.M.G., M.C., D.M., F.R.S., Fellow of St. John's College, Oxford, and J. G. Priestly, M.C., D.M., Christopher Welch Lecturer in Clinical Physiology, University of Oxford 232 pages, price $4.00. Published by Oxford University Press, 25 Richmond St. W., Toronto.

This is a most excellent work upon applied physiology. Experiments are planned with a view of familiarizing the student with the recent work in respiration, metabolism, the blood and circulation, and kidney excretion. All experiments are designed to be carried out upon the human subject so that the book should prove of the greatest value to the advanced student of physiology as well as to the physician who wishes a practical guide to physiological problems as they apply to the clinic but who has not the opportunity to consult the original papers. There is, however, a good bibliography of the more important papers for those who wish to pursue further the experimental work upon a particular subject.

The work is essentially practical and methods for such important determinations as the analysis of alveolar air, total respiratory exchange, blood volume, blood sugar, renal efficiency, etc., are given in detail. N. B. T.

Materia Medica for Nurses. By A. L. Muirhead, M.D., and Edith P. Brodie, A. B., R.N. Second edition. 190 pages, illustrated. Price $2.00. The C. V. Mosby Co., 506 N. Grand Boulevard, St. Louis. 1924.

In this volume of less than two hundred pages, the authors have set forth in a clear, concise manner, the preparation, dosage, physiological and therapeutical effects, as well as the toxic properties, of the drugs commonly employed in the medical treatment of disease. These different agents are conveniently arranged in groups according to their therapeutical uses.

There is a chapter on the preparation of solutions ordinarily used in hospital wards and operating rooms, and another on apothecaries weights and measures with the corresponding metric system.

The text is such as may be easily understood by the student. This volume should not only be of every day use to the nurse in training but also a ready reference for the graduates. A. H. MacCORDICK

Notes on Pathological and Operative Obstetrics. By Lyle G. McNeile, M.D., Professor of Clinical Obstetrics, College of Medical Evangelists, Los Angeles. Sections I. to VIII. Lefax Inc., Philadelphia. 1924.

In his introduction the author states that the work is intended for senior medical students and busy practitioners. His object has been to furnish them with a definite plan to follow in cases of emergency. The book is a loose leaf one of handy pocket size, but is not intended as a quiz-compend nor as a substitute for a text-book

The arrangement is simple and definite and there is a good index. As a rule the directions in regard to treatment are definite and specific and are those that have proved their value. Exception, however, must be taken to the statement that, in eclampsia, "experience proves conclusively that the rapid emptying of the uterus under deep narcosis after the first convulsion gives the best results." This is directly counter to the conclusions reached by the British Congress of Obstetrics and Gynaecology at their Liverpool meeting in 1922. The author mentions Stroganoff's method of expectant treatment of eclampsia but condemns it as illogical. The sections on haemorrhage, expression of the foetus, forceps extractions and version are good. Unfortunately the work is somewhat marred by careless proof reading. R. B. M.

On the Breast. By Duncan C. L. FitzWilliams, C.M.G., M.D., F.R.C.S., Surgeon in charge of Out-Patients, and Lecturer on Operative Surgery to St. Mary's Hospital; Surgeon to Paddington Green Children's Hospital, and to Mount Vernon Hospital for Tuberculosis. Royal 8vo, 456 pp, 166 illustrations and 2 plates. Price 30s. net. Published by William Heinemann Limited, London, 1924.

This volume is a most complete dissertation on the breast, its development, anatomy, abnormalities, anomalies and curiosities, and its diseases. It is well written in a smooth, easy and conversational style which renders its perusal a source of real pleasure.

Each chapter has a full list of references appended, and throughout the subject matter, clinical notes are given of illustrative cases, both of which enhance materially the value of the work.

The author does not unduly advance his own opinions, but quotes freely from the writings of others both as to pathology and operative methods, contenting himself with indicating what in the light of his own experience is the more correct.

The illustrations are numerous, but are all black and white line drawings, which, while serving their purpose, in most instances admirably, do not present such an attractive appearance as we are nowadays led to expect. Other than the outlines of incisions practically no illustrations are given of operative methods.

The volume can hardly be classed as a text-book for the junior student, but will make an especial appeal to the reader of some experience, who will find much food for thought in the various arguments advanced by the author. E. R. S.

The Errors of Accommodation and Refraction of the Eye, and their Treatment. A handbook for students. By Ernest Clarke, M.D., F.R.C.S. Fifth Edition. Baillière, Tindall and Cox, London, England.

Dr. Clarke's handbook is a clearly-written and sound exposition of the subject of the refraction of the eye for students, and can be cordially recommended. The octavo size is especially convenient for a work of this kind. The print is clear, and the illustrations are numerous and well chosen. The fact that it is a fifth edition emphasizes its value. W. G. M. B.

The Extra Pharmacopoeia. By W. Harrison Martindale, Ph.D., F.C.S. and W. Wynn Westcott, M.B., D.P.H. Eighteenth edition, in two volumes. Vol. 1, 1163 pages. Price 27s. 6d. net. H. K. Lewis & Co. Ltd., 28 Gower Place, London, 1924.

A great many practitioners must have watched the growth of the *Extra Pharmacopoeia* from its first small volume to its present pressed down and overflowing two volumes, and it must be almost inevitably suggested that the point is fast approaching when the ground will be too extensive to be so thoroughly traversed in convenient form. Let us hasten to add that if and when that point is reached the failure to be quite suitable to the general practitioner will result only from the unavoidable unwieldiness of the subject, nor from the incapacity of the present editors to cope with this feature.

Such a reflection is all the more likely when one looks at the complete set of the editions of this work. The first edition was in 1883 and numbered about 321 pages on heavy paper. The present 18th edition, on

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very thin paper, is in two volumes, numbering 1850 pages. All through these editions one continually finds signs of attempts to compress; in the 8th edition 30 pages were taken out, only for 116 to be put in, and the present edition itself has not been allowed to remain unpruned, although the pruning in one place has not compensated in amount for the addition in others.

There is no feature of this publication more admirable than the references to current literature; these appeared in the very first edition and have always been kept well up to date.

The book can be most highly recommended. The price is increasing with each fresh edition, but there is a more than proportionate increase in its contents.

H. E. MACDERMOT

The Non-Surgical treatment of Goitre. By Israel Bram, M.D. 455 pages. The Macmillan Co. of Canada, Toronto, 1924.

The recently published book by Bram on the treatment and management of goitre seems to be an effort on the part of the author to draw a sharp distinction between surgical and non-surgical types of goitre.

In this differentiation he deals particularly with exophthalmic goitre as a non-surgical disease, and discusses thoroughly his reasons for this assumption, giving at length his treatment and therapeutic measures for combatting this disorder.

He has also dealt very fully with the various associated conditions that may seriously affect the treatment as laid down by himself, and has carefully recorded measures to be adopted to deal with them.

While it is refreshing to read Dr. Bram's confidence in medical measures for the treatment of this disorder, one cannot help thinking from clinical experience that this complicated disease is only made more complex and confused by the course he proposes to adopt, and the wisdom of entirely discarding surgery for the relief of this condition is open to grave doubt.

C. R. G.

The Surgical Clinics of North America. Volume iv, Number 4 (Cleveland Number—August, 1924), 248 pages with 218 illustrations. Per clinic year (February, 1924 to December, 1924). Paper $12.00, cloth $16.50 net. Philadelphia and London, W. B. Saunders Company. The J. F. Hartz Co. Ltd., Toronto and Montreal.

This number of the Surgical Clinics of North America is somewhat of a surprise, as only eight articles out of twenty-three are on surgical subjects; the others are all on medical subjects. One cannot help comparing the volumes of these surgical clinics appearing to-day with the Murphy Clinics of—say 1912. The Murphy Clinics were famous for their freshness and spontaneity. The surgical clinics of to-day are more of the nature of carefully prepared papers, and this criticism applies not only to this Cleveland Clinic number, but to many of the others. Considering each article as a carefully prepared paper, one cannot express anything but admiration for them. Anything coming from the Cleveland Clinic, is well presented. The subject matter is carefully chosen, and presented in a manner that illustrates the wide variety of work done at this clinic. Time and space forbids a review of each article, all of which are excellent.

A. R. M.

Correlation of Clinical Roentgenologic and Serologic Evidences of Rickets in Breast-Fed.—L. R. DeBuys and Ludo von Meysenbug, New Orleans, attempted to determine which of the clinical signs of rickets are the reliable diagnostic ones. They have examined sixty-eight infants, aged from four to forty-four weeks, for bosses, craniotabes, flaring ribs, beading, enlargement of epiphyses, and bowed legs, in addition to roentgenographing the wrists and determining the phosphate and calcium of the blood plasma. The positive roentgenographic findings, the positive clinical manifestations, and the abnormal blood changes ran parallel. Epiphyseal enlargement seemed the most dependable clinical manifestation of rickets and costal beading the symptom next in importance. Craniotabes appeared so often and in such marked degree in cases with normal blood and roentgen-ray findings as to be unreliable if considered alone. Moreover, this symptom is not dependable because it appeared, as a rule, at an early age and was of short duration. Cranial bosses, flaring ribs and bowed legs must be regarded as later changes that result from rickets. Within the first twelve weeks of life the blood analysis did not show any changes indicative of rickets. From the twelfth to the twentieth week, the blood changes were more pronounced, and after this period there was a gradual return to normal. The seasonal variation of the blood phosphate was noted, the lowest average occurring in March. Serologic examination for rickets was the most reliable procedure for determining the activity of the disease; but it is not always of practical application. Positive roentgenographic evidence was of decided value in the diagnosis of the disease. —*Jour. Am. Med. Ass.*, Nov. 15, 1924.

Mercurochrome-220 Soluble in Rocky Mountain Spotted Fever.—H. P. Greeley, Madison, Wis., reports a case of Rocky Mountain spotted fever which was clinically arrested by mercurochrome given intravenously, with the exception of the headache and painful neck, which continued for five days. He asks if it is likely that in the helter skelter use of intravenous medication tick fever may be more responsive because of its pathology than some other conditions; and hopes that his experience may lead those in the West, where the fever is so fatal, to give mercurochrome a further trial. —*Jour. Am. Med. Ass.*, Nov. 8, 1924.

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Books Received

Anaesthesia for Nurses—By William Webster. 153 pages, illustrated. Price $2.00. The C. V. Mosby Co., 508 North Grand Boulevard, St. Louis. 1924

Affections Chirurgicales du Gros Intestin—(Nouveau Traité de Chirurgie, 3rd ed. fasc. 37)—By E. Meriel, 452 pages, illustrated. J. B. Bailliere & Fils, Paris. 1924.

A Text-book of Materia Medica for Nurses—By A. L. Muirhead, M.D. and Edith P. Brodie, A.B., R.N. Second edition. 190 pages, illustrated. Price $2.00. The C. V. Mosby Co., 508 North Grand Boulevard, St. Louis. 1924.

A Synopsis of Special Subjects. **Diseases of the Skin**—By H. Semon, M. D., **Obstetrics and Diseases of Women**—By M. Donaldson, F.R.C.S., **Ear, Nose and Throat**—By Archer Ryland, F.R.C.S., **The Eye**—By J. F. Cunningham, F.R.C.S. 376 pages. Price 18/- net. H. K. Lewis & Co., Ltd., London, 1924.

Developmental Anatomy—By Leslie Brainerd Arey. 433 pages, with 419 illustrations. Price $5.50 net. W. B. Saunders Co., Philadelphia and London; Canadian Agents, The J. F. Hartz Co. Ltd., Toronto and Montreal, 1924.

Diseases of the Heart—Henri Vaquez, M.D., translated by George F. Laidlaw, M.D., with an introduction by William S. Thayer, M.D., F.R.C.P.I. (Hon.). Octavo volume of 743 pages, illustrated. Price $9.50. W. B. Saunders Co., Philadelphia and London; Canadian Agents, The J. F. Hartz Co. Ltd., Toronto and Montreal, 1924.

Errors of Accommodation and Refraction of the Eye and Their Treatment—By Ernest Clarke, M.D., F.R.C.S. Fifth edition. 251 pages, illustrated. Bailliere, Tindall and Cox, 8 Henrietta St., Covent Garden, London, W.C.2. 1924.

Human Constitution—By George Draper, M.D. A consideration of its relationship to disease. 345 pages, illustrated. Price $8.25 net. W. B. Saunders Co., Philadelphia and London; Canadian Agents, The J. F. Hartz Co. Ltd., Toronto and Montreal. 1924.

Infantile Paralysis in Vermont, 1894-1922—A Memorial to Charles S. Caverly, M.D. 375 pages. State Department of Public Health, Burlington, Vt. 1924.

Immunity in Natural Infectious Diseases—By F. D'Herelle, authorized English Edition by George H. Smith. 399 pages. Price $5.00. Williams & Wilkins, Baltimore, Md. 1924.

Internal Secretion and the Ductless Glands—By Swale Vincent, LL.D., D.Sc., M.D., M.R.C.S., L.R.C.P., F.R.S. Third edition 463 pages, illustrated. Price 25s. net. Edward Arnold & Co., London W.1. 1924.

Landmarks and Surface Markings of the Human Body—By L. Bathe Rawling, M.B., B.C. (Cant.), F.R.C.S. Sixth edition. 97 pages, 36 illustrations. Price 7s. 6d. net. H. K. Lewis & Co. Ltd., 28 Gower Place, London, W.C.1. 1924.

Manual of Psychiatry—By Paul E. Bowers, M.S., M.D. Octavo volume of 365 pages. Price $4.00. W. B. Saunders Co., Philadelphia and London; Canadian Agents, The J. F. Hartz Co. Ltd., Toronto and Montreal, 1924.

Manual of Diseases of the Nose, Throat, and Ear—By E. B. Gleason, M.D., LL.D. Fifth edition, thoroughly revised. 660 pages, illustrated. Price $4.00 net. W. B. Saunders Co., Philadelphia and London; Canadian Agents, The J. F. Hartz Co. Ltd., Toronto and Montreal. 1924.

Manual for Diabetics—By Gladys L. Boyd, M.D. and Marion D. Stalsmith, with an introduction by F. G. Banting, M.D. 90 pages. McClelland & Stewart, Ltd., Toronto, 1924.

Operative Surgery—By Warren Stone Bickham, M.D., Phar. M., (Tulane), M.D. (Columbia), F.A.C.S. Vol. v, 880 pages, 6378 illustrations. Price $10.00. W. B. Saunders Co., Philadelphia and London; Canadian Agents, The J. F. Hartz Co. Ltd., Toronto and Montreal. 1924.

Paediatrics—By various authors. Edited by Isaac A. Abt, M.D. Vol. v. 865 pages, 373 illustrations. Price $11.00. W. B. Saunders Co., Philadelphia and London; Canadian Agents, The J. F. Hartz Co. Ltd., Toronto and Montreal, 1924.

Prescription Writing—By Cary Eggleston, M.D. Third edition, revised. 146 pages . Price $1.50 net. W. B. Saunders Co., Philadelphia and London; Canadian Agents, The J. F. Hartz Co. Ltd., Toronto and Montreal.

Pneumonia, Its Pathology, Diagnosis, Prognosis and Treatment—By the late Murray Leslie, M.A., B.Sc., M.D. Edited and revised by J. Browning Alexander, M.D., M.R.C.P. 351 pages. Price 12s. 6d. net. Wm. Heineman (Medical Books) Ltd., 20 Bedford St., London, W.C.2. 1924.

Physical Diagnosis—By W. D. Rose, M.D. Fourth edition. 755 pages. 319 illustrations. Price $8.50. The C. V. Mosby Co., St. Louis, Mo., 1924.

Pediatrics—By various authors. Edited by Isaac A. Abt, M.D. Vol. iv, 1271 pages, 218 illustrations. Price $11.00. W. B. Saunders Co., Philadelphia and London; Canadian Agents, The J. F. Hartz Co. Ltd., Toronto and Montreal. 1924.

Reports from the Laboratory of the Royal College of Physicians of Edinburgh—Edited by Sir Oliver Robert William Philip, M.D., LL.D., and Anderson Gray M'Kendrick, M.B. Vol. xv., illustrated. Oliver and Boyd, Edinburgh. 1924.

Rheumatic Heart Disease—Carey F. Coombs, M.D., F.R.C.P., with an introduction by F. J. Poynton, M.D., F.R.C.P. 376 pages, illustrated. Price 12s 6d. John Wright & Sons Ltd., Bristol. 1924.

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